NORTH FAMILY, MOUNT LEBANON SHAKER VILLAGE
Mount Lebanon Shaker Society
202 Shaker Road
New Lebanon
Columbia County
New York

HALS NY-7
*NY-7*

PHOTOGRAPHS

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FIELD RECORDS

HISTORIC AMERICAN LANDSCAPES SURVEY
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HISTORIC AMERICAN LANDSCAPES SURVEY

NORTH FAMILY, MOUNT LEBANON SHAKER VILLAGE

HALS No. NY-07

Location: 202 Shaker Road, New Lebanon, New York 12125. The village is located on the west slope of Mount Lebanon in the Taconic Range about 1.2 miles southeast of New Lebanon, Columbia County, New York.

Present Owner: Shaker Museum and Library

Present Occupant: The Shaker Museum occupies the area historically referred to as the North Family village. The Darrow School is located within the area adjacent to it, formerly occupied by the Church and Center Families.

Present Use: Currently, the Shaker Museum is open to visitors for special events only, but is currently undergoing rehabilitation that will enable a more broad visitation and interpretation. The Darrow School is a privately run educational facility.

Significance: Mount Lebanon Shaker Village, which operated from 1787 to 1947, was the largest, most successful, and influential of the Shaker communities in America, earning it the reputation as the "Central Ministry."[1] The Shakers were founded as a Christian sect in England in 1747 under the leadership of Ann Lee. Like many other protestant religious groups, the Shakers fled persecution to seek religious toleration in America, first settling in New England and later expanding westward.[2] The Shakers are a utopian, communal society based on principals of celibacy and self sufficiency, who embrace the tenets of equality of labor, gender, and race, as well as communal property, freedom, and pacifism. As the physical and spiritual center of the national Shaker community, which grew to nineteen villages, it was from Mount Lebanon that their beliefs and tenets were instituted and disseminated. The Shakers of Mount Lebanon and elsewhere are perhaps best recognized for their innovative approaches to the design and manufacture of goods based on function and simplicity.

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[1] Marguerite Fellows Melcher. *The Shaker Adventure* (Cleveland: Western Reserve University Press, 1941), 56; cited in HABS No. NY-32991: 3; and John Mesick. *The North Family Complex of the Mount Lebanon Shaker Village: The Site of a New Museum* (Trustees of the Mount Lebanon Shaker Village, January, 2000). Over time, Mount Lebanon has been referred to as the "Center of Union," "Central Ministry" and "Holy Mount" for the United Society of Believers in Christ's Second Appearing.

[22] The Shakers initially settled in New York, Massachusetts and Connecticut, expanding into New Hampshire, Maine and eventually westward to Kentucky, Ohio, and Indiana.

This was expressed in the objects that they produced such as buildings, furniture, and other household items. Their innovation and commonsense approach design and management was also manifested in their village planning, as well as in their noteworthy agricultural and industrial pursuits.

In its heyday, Mount Lebanon Shaker Village was the largest of the nineteen Shaker villages in the United States, comprising about 600 people, 100 buildings, and 6,000 acres of land, a fair portion of which was under cultivation.[3] Their disciplined lifestyle made them highly successful as farmers, mechanics, builders, and tradesmen and women. The "North Family" was considered the novitiate order within the society and the link between the Shaker Church and the outside world, sitting both literally and symbolically at "the gate" into the community.

The Mount Lebanon Shaker Village closed in 1947, and in 1965 it was declared a National Historic Landmark as the most significant and comprehensive example of the Shaker's domestic, agricultural and industrial ideals. Mount Lebanon reflects the history of the Shaker hybridization of agriculture and industry as manifested by elements such as its innovative system of water management to provide irrigation and to power their workshops. Likewise, the large stone dairy barn on site is seen as an icon of Shaker industry and prosperity. Today it is home to the Shaker Museum and includes many significant plain-style buildings and cultural landscape features.

Historian: David Driapsa, ASLA, Landscape Architect, for HALS

## PART I. HISTORICAL INFORMATION

### A. Physical History

1. Date of establishment: The Mount Lebanon Shaker Village, North Family was first established in 1787. The site currently includes ten significant historic structures, including those intended for domestic, agricultural, and light industrial purposes, that date from 1829 to 1859. (The First Dwelling was demolished in the 1970s. Remnants of the foundations of the large sawmill, icehouse, garden house and lumber shed are also extant). The first mention of a water powered sawmill is in 1796. By 1809, there is record of a fulling mill and a community

[3] Richard Greenwood. "Mount Lebanon Shaker Society, National Registry of Historic Places Inventory – Nomination Form," (Washington: National Park Service, 1983), 7.

carding machine operated by waterpower. The Shakers pooled their resources in 1825 and hired Moses Johnson to build a millpond and a gristmill where Cherry Lane crosses the stream above Walker's sawmill, southwest of the North and Church Families.[4]

2. Landscape architect, designer, shaper, creator: While a vernacular residential, agricultural and light industrial landscape, the village demonstrates a high level of sophistication in its planning and use, as shaped by members of the Shaker community. Thus, the Shaker cultural landscape is characterized by functionalism and simplicity of form adapted for agriculture and manufacturing. Father Joseph Meacham "set about developing the Mount Lebanon community and in effect standardized plans for subsequent communities."[5] There were no standard plans, however, and the landscape evolved through trial and error over long periods with ideas transmitted by oral tradition. The only written guidance found for the design of the landscape was prepared for creation of the holy feast grounds on a nearby mountain peak, and for some of the fencing, paths, dooryards, and plantings.

3. Builder, contractor, laborers, suppliers: As with the landscape, the buildings were designed and erected by the members of the Shaker community and reflect their strongly held tenet of simplicity. Buildings, fences, dams, roads, and paths are substantial and built with care, using natural materials, mostly stone and wood.

4. Original and subsequent owners, occupants: The property was owned communally by the Mount Lebanon Shaker community from 1787 to 1947. However, as the Shaker community declined in population in the early 20th century, the site was gradually sold to various private owners, including the Darrow School in 1930, which still inhabits the area formerly occupied by Mount Lebanon's Church and Center Families. The 1939 boundary of the Mount Lebanon Shaker Village was about 1,442 acres based on a land survey undertaken by A.J. Kohlhofer. In 2004, the North Family parcel was purchased by the Shaker Museum and Library as the future home for the museum. The current North Family site is a thirty acre parcel.

5. Periods of Development

    a. Original plans and construction: The Shaker cultural landscape consisted of a tight cluster of simple but massive buildings, with fine barns, workshops and auxiliary buildings set among neat kitchen gardens, surrounded by fields and pastures contained within everlasting stones walls, interspersed with fruit and nut orchards, managed woodlots on

[4] William L. Lassiter. *Shaker Architecture* (New York: Bonanza Books, 1962). "The Shakers had among them men of much experience in construction work. From the Shaker Manifesto, the monthly journal, autobiographies and biographies, research discloses that 'master builders' or architects, possessed extraordinary ability, and what is left for inspection attests to this claim."
[5] Greenwood, 2.

steeper slopes, and grassy meadows and deep forests on the mountain above the village and a productive swamp below. Within this already diverse agricultural landscape, millstreams, millponds and water-powered mills and workshops were particularly evident. These were the workspaces of a community of a self-sufficient people and gave the Shaker village its distinctive appearance.[6] By 1797, a garden for the use of the family, called a kitchen garden, was laid out and kept separate from the botanical and seed gardens. Fruit trees were planted at an early date, and in 1848 strawberries were first raised in quantity. Threshing machines were first used in 1815, a "side-hill plough" in 1825, hay rake in 1827, and a mowing machine in 1856.

One of the earliest descriptions of the mills at the North Family of Hancock Shaker Village was by a visitor in 1818, "A small stream of water comes down the mountain from which a dam is erected for the use of the thrashing mill.... Below this stands the corn or grist mill, and below that the saw-mill. From the saw-mill the stream is conducted by an aqueduct under ground to the middle of the village, where it is made to pass through a hollowed tree for the purpose of turning a large overshot wheel that serves to work their machinery. From this wheel the water is conveyed underground to the washing-rooms, and also for watering the horses, stables, works, etc."[7]

b. Changes and additions: Comparison of the 1942 aerial photograph[8] with recent aerial photographs[9] reveals the extent of landscape change that occurred since the Shaker management of the land ceased in 1947, a little more than a half century ago.[10] Old field succession, or the natural regeneration of forest and brush land, has overtaken the Shaker fields, pastures and meadows that are no longer maintained. Some areas of pasture and meadow have persisted under new owners and new land uses, including aesthetic considerations for views of open meadows. Darrow School maintains large expanses of meadows as a form of visual resource management and for sports and recreational fields. Some neighboring

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[6] Robert P. Emlen. *Shaker Village Views: Illustrated Maps and Landscape Drawings by Shaker Artists of the Nineteenth Century* (Hanover and London: University Press of London, 1987), 7.
[7] W.S. Warder. *A Brief Sketch of the Religious Society of People Called Shakers* (London: R. and A. Taylor, 1872), cited in Vaillancourt, Dana, "Archeological Excavations at the North Family Dwelling House Site," (Master Thesis, Rensselaer Polytechnic Institute, 1983).
[8] U.S. Soil Conservation Service, Aerial Photograph, Columbia County, New York, 3-124, July 13, 1942 and 6-166_GS-AE, August 25, 1942. Courtesy of the Columbia County Soil & Water Conservation District.
[9] GoogleEarth and GoogleMaps.
[10] According to Stephan Stein, "The fifteenth of October 1947 was a significant day in Shaker history, for on that date the last of the Mount Lebanon Shakers relocated at Hancock [Shaker village across the state line in Massachusetts]." Stein, Stephen *The Shaker Experience in America* (London: Yale University Press, 1992), 350.

property owners maintain small clearings. Other land owners around the ring of hills that surround the Lebanon Valley maintain land in grassy meadows. Preservation of a visual semblance of the pastoral Shaker cultural landscape is retained only through many individual decisions to maintain open meadows. No means of comprehensive visual resource management yet exists for preserving the Shaker pastoral landscape.

B. Historical Context:

First brought into gospel order in 1787, the Mount Lebanon Shaker Village grew to include eight families know as the North, Church, Center, Second, South, East, Upper Canaan and Lower Canaan families. Five of the families were arranged around the Church Family along a one and one-third mile section of the Albany to Pittsfield Post Road. The East and the two Canaan family buildings lay within three miles of the Church Family. Their lands, however, were contiguous. Each family was an independent economic entity with its own agricultural lands and buildings, its own domestic accommodations, and its own facilities for mechanical trades. According to Richard Greenwood, "The Shakers attempted to assign each family specific crafts and duties, which were also regulated by gender, and so each family had workshops for its own particular pursuits."[11]

The principal industries of the Mount Lebanon Shakers were agriculture and workshop-based manufacturing. Agriculture and workshop activities often were related, such as in the seed and medicinal herbal business. The North Family cultivated garden seeds for sale and organized the landscape for row crop production. While farming was an industry of the Brethren, seeds were gathered by both Brothers and Sisters, and usually packaged in envelopes by the Sisters.[12] The Brothers fabricated wooden seed boxes to display neatly printed paper seed packets at general stores along wide-ranging distribution routes traveled each year by the family peddlers. The seed business grew out of the earlier industry of processing herbs for medicinal preparations.

In 1844, the first and second orders of the Church Family (i.e. the Church and Center families) divided the seed and herb businesses, with the Church family taking on the seed production and distribution and the Center Family the operating the medicinal business. However, the North, East and Second families all had their own seed business, each with a separate trade route so as not compete with one another. In addition to processing seeds, other North Family businesses included raising and selling grain, milling,

[11] Greenwood, 1.
[12] Edward D. Andrews. *The Community Industry of the Shakers.* Reprint of New York State Museum Handbook 15 (Emporium Publications, 1971).

blacksmithing, shirt and ladies' fancy goods manufacturing, broom and mop making, orchards and processed foodstuffs, such as butter and honey.[13]

The Shakers cultivated medicinal herbs in "physic gardens" and gathered herbs and other medicinal plants from all parts of the landscape between the mountain heights and lowland swamps, with some natural sources considered superior to cultivated sources.[14] Leaves, seeds, roots, flowers and bark were processed in workshops, where it was ground into medicinal powders, distilled into extracts, bottled and distributed as herbal remedies. Springs were developed and piping run down the mountain to bring pure mountain spring water into the workshops for use in distilling herbal extracts. The Second and South Families developed a chair making industry. According to Michael Coe, "Mount Lebanon became known throughout the eastern United States through the high quality of its industrial and agricultural products, such as seeds in packets, medicines, medicinal herbs, and above all, chairs."[15]

**Agriculture**

Shaker agriculture was a hybrid of farming and workshop activity, semi-agricultural and semi-industrial occupations, a combination of gardening and mechanics. Shaker agriculture originated from the basic need to feed a growing community, to growing kitchen garden foodstuffs for their tables, to the profitable industries of growing and processing medicinal herbals and seeds.[16] According to John Hayward, author of the *Book of Religion*, in 1843, "In our occupation we are agriculturists and mechanics. The products of the garden may be said to be as important as any; which are principally seeds, herbs, etc., from which this section of the county is chiefly supplied. Our manufactures are woodenware, such as tubs, pails, half-bushel and other measures, boxes, etc.; also whips, corn-brooms, leather, and various other artifacts. We keep from 1200 to 1500 sheep, mostly Saxon and Merino, which afford wool for our own wear, and are likewise a source of small trade with us."[17]

The "order, neatness, and cleanliness" of the villages is often stressed in Shaker literature and included as a part of the Shaker religion.[18] According to Catherine L. Carter and Martha E. Geores, authors of *Heaven on Earth*, "This millennial sect worked to establish heaven on earth, building nineteen communities…according to the precepts of Shaker theology…centered in their belief system that the Shaker villages would be the locus of

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[13] Jerry V. Grant, "The Social History of the North Family Shakers 1800-1947," in Page Ayres Cowley Architects, "Historic Structures Report: North Family and Second Meetinghouse, Mount Lebanon Shaker Village" (September 20, 2003), 7.
[14] Amy Bess Miller, *Shaker Herbs: A History and a Compendium* (New York: Clarkson N. Potter, 1976).
[15] Michael D. Coe. Mt. Lebanon Shaker Village NEH Application. September 30, 1986, p. 1.
[16] Edward D. Andrews. *The Community Industries of the Shakers.* (Reprint of New York State Museum Handbook 15, 1933), p. 88.
[17] Hayward, 256. The Trustees of the Enfield, New Hampshire Shakers contributed a summary of their agriculture and manufactures to Hayward's Book.
[18] Ibid.

God's kingdom on earth. The Shakers produced their space by regulating the appearance of…the village layout and architecture to the precepts of their theology."[19]

The Shaker combination of agriculture and mechanical industries is particularly evident in the North Family where the seed business was a principal industry conducted on a large scale and for half a century. They improved the soil for agriculture, built waterworks for powering workshops to create and improve implements for farming, processed seeds from harvest to packaged seed products, constructed cellars and sheds for storage, made wagons for transporting seeds on the market routes, maintained inventories and ledgers, and collected receivables.

The process of seed production from field to workshop to market was an early form of processing plant or assembly line. The Shakers had good business sense in the seed business, and as in many other endeavors developed its economic opportunities.[20] They were inventive in the use of plants and found many practical and economic uses. The Shakers found great abundance in the plant kingdom. All plants seemed to have some use. Some plants provided a source of food, others a source of healing, and others were useful for manufacturing. Many plant parts were useful and the Shakers utilized flowers, seeds, leaves, bark roots, and wood one form or another from making medicine to processing and dying manufactured leather and wood products.[21] Even the lowly thistle was used by the Shakers to process cloth.

William Hepworth Dixon, writing in 1867, commented after visiting the Mount Lebanon Shaker Village and spending a few days in the North Family with Elder Frederick Evans and Elderess Mary Antoinette Doolittle, "How much has been done in a few short years towards converting this corner of New York State from a rugged forest…into the likeness of an earthly Eden…. Where, save in England, do you see such a sward? The trees are greener, the roses pinker, and the cottages neater, than on any slope. New Lebanon has almost the face of an English valley, rich with the culture of a thousand years."[22] Understanding their use of the land and the bounty of nature is the key to unlocking the "secrets of Mount Lebanon."[23] Their remarkable abilities to harvest the bounty of nature, cultivate surplus from the soil, and create mechanical power from water enabled the Shakers to achieve an exceptional material culture for the time.[24]

The early history of farming at New Lebanon was gleaned by Andrews from the *Manifesto* for March 1890.[25] Wheat, oats, rye, barley, corn, flax and potatoes were the

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[19] Catherine L. Carter and Martha E. Geores. "Heaven on Earth: The Shakers and Their Space. *Geographies of Religions and Belief Systems*, University of Maryland, Volume 1, Number 1. October 2006, pp.6-27.
[20] Ibid., p. 88.
[21] Ibid.
[22] William Hepworth Dixon. *New America*. (Philadelphia: J.B. Lippincott & Co, 1867), p. 303.
[23] William Hepworth Dixon. *New America*. (Philadelphia: J.B. Lippincott & Co, 1867), p. 302.
[24] "The Shaker Image. (Boston: New York Graphic Society, 1974), p. 114.
[25] According to White and Taylor, "From 1871 to 1900, a periodical was published.… While devoted to Shaker thought and belief, the magazine took high rank as a literary production and was widely read,

first crops cultivated. By 1797, a garden for the use of the family, called a kitchen garden, was laid out and kept separate from the botanical and seed gardens. Fruit trees were planted at an early date, and in 1848 strawberries were first raised in quantity. Threshing machines were first used in 1815, a "side-hill plough" in 1825, hay rake in 1827, and a mowing machine in 1856. The farms were managed by certain persons, both male and female, called "farm deacons," "orchard deacons" and so on, who were, as the Shakers phrased it "appointed specially to that calling." At certain busy times of the year, during the planting, haying and harvesting season, the farm work required extra help, and brethren engaged in other occupations were drafted into agricultural labors. The cutting of firewood in the extensive wood lots…required the services of many laborers. [26]

The careful study of agriculture was exalted by the Shakers into a kind of religious ritual. They looked upon the soil as something to be redeemed from "rugged barrenness into smiling fertility and beauty."[27] This thought is expressed in many ways. Dixon found the Shakers believing that 'if you would have a lovely garden, you should have a lovely life,' and in the introduction to the Gardener's Manual published in 1843, the writer insists that the garden is "an index of the owner's mind." Dixon's conversation with Elder Frederick Evans illuminates this attitude of spiritual devotion to husbandry.[28]

At the height of the Shaker Community at Mount Lebanon, the economy of the North Family was made prosperous under the able leadership of Elder Richard Bushnell. The family had purchased and expanded its land holdings and added to the farm to a great extent, even by two-thirds. Under the leadership of Elder Frederick Evans, the family improved the farm by removing rocks from the fields and combining them with quarried stone to build sturdy fences of stone. They dug trenches across the fields and laid tile under drains in wet depressions to remove the water and make the land suitable for cultivation. They spread compost, plowed in rye grass (an organic form of nitrogen fertilizer) and car loads of ashes (an organic form of potassium fertilizer) shipped to New Lebanon from as far away as Canada for this purpose. This careful management of the farm yielded surplus grain, meat, wool and dairy products. The family constructed a fine and commodious barn and auxiliary sheds and workshops for their farm, garden seeds and broom manufacturing industries from money earned from their income and investments. All this was achieved through "proper industry, good economy and frugality."[29]

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forming a link among the societies whose loss, when it was discontinued, was severely felt." In Anna White and Leila Taylor. *Shakerism: Its Meaning and Message, Embracing an Historical Account, Statement of Belief and Spiritual Experience of the Church from its Rise to the Present Day*. Columbus, Ohio: Press of Fred J. Heer, 1905, p. 320.

[26] Edward D. Andrews. *The Community Industries of the Shakers*. Reprint of New York Museum Handbook 15 (Charlestown, MA: Emporium Publications, 1993), pp. 60-62.

[27] Dixon, Hepworth. *New America*. Philadelphia: J.B. Lippincott & Co., 1867, p. 321.

[28] Edward D. Andrews. *The Community Industries of the Shakers*. Reprint of New York Museum Handbook 15 (Charlestown, MA: Emporium Publications, 1993), pp. 60-62.

[29] Bushnell, Richard, Mount Lebanon, NY, to [Ministry, Mount Lebanon, NY], January 1860. NOC, mss. No 12174. Cited in Jerry V. Grant. "The Social History of the North Family Shakers 1800-1947," Page

Visitors to Mount Lebanon at this time have left a record of the bountiful and ideally managed farm.[30] Springs Road (Now named Darrow Road) was described as a green lane. The houses stood among gardens "*in which the Baltimore vine runs joyously up poles and along espaliers.*"[31] The millstream ran through the gardens, with mills and workshops placed advantageously to utilize the waterpower.[32] One observer noted the "perfect fences" of stone "so massy" and constructed so well as so withstand the centuries. Even the fence posts were finely constructed of stone to carry the decorative light wooden picket fences.[33] Another observed that field stones laid into walls divided up the cultivated fields into a mosaic pattern. Their woodlands received care and wise management for the value their value in timber and other renewable natural resources.[34] Yet another noted their cultivation of the land extended from the summit of the mountains into the valley into the swamp, providing all the sustenance needed.[35]

The decline of the male population of the North Family in the early twentieth century led to only Sisters remaining to care for the farm.[36] With fewer Brethren and eventually none to carry on the workshop industries there was a decrease in every branch of manufacturing and the family came to rely on farming and fruit-growing and hired hands to do the labor. Even with the reduced land base from selling the Church and Center Families in 1930, the remaining Sisters congregated into the North Family continued to work the North Family farm until the last Shaker left in 1947. The farm had been planted and cultivated for more than a century and there was a strong tradition of agriculture within the family. Fruit and nut trees planted in the nineteenth century provided for the family long past the "*zenith of its material development.*"[37]

**Waterworks**

The emerging industrialization in New England where the combination of a moist climate, numerous mountain streams, and a growing base of technology savvy

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Ayres Cowley Architects, Historic Structures Report: North Family and Second Family Meetinghouse, Mount Lebanon Shaker Village. (September 20, 2003), p. 32.

[30] Julian Niemcewicz (1758-1841). *Under Their Vine and Fig Tree; Travels through America in 1797-1799*, In Glendyne R. Werland. *Visiting the Shakers, 1778-1849*. (Clinton, NY: Richard W, Couper Press, 2007), p. 135

[31] William Hepworth Dixon. *New America*. (Philadelphia: J.B. Lippincott & Co, 1867). P.301-315.

[32] Andrew Bell, *Men and Things in America*. , In Glendyne R. Werland. *Visiting the Shakers, 1778-1849*. (Clinton, NY: Richard W, Couper Press, 2007), p. 235.

[33] Benjamin Silliman (1779-1864). Remarks made on a Short Tour between Hartford and Quebec, in the Autumn of 1819," In Glendyne R. Werland. *Visiting the Shakers, 1778-1849*. (Clinton, NY: Richard W. Couper Press, 2007), p. 135.

[34] William Strickland. *Journal of a Tour in the United States of America, 1794-1795*, In Glendyne R. Werland. *Visiting the Shakers, 1778-1849*. (Clinton, NY: Richard W. Couper Press, 2007), p. 145

[35] "Character of the Shakers," *Boston Weekly Magazine*, In Glendyne R. Werland. *Visiting the Shakers, 1778-1849*. (Clinton, NY: Richard W. Couper Press, 2007), p. 175.

[36] Stein, Stephen *The Shaker Experience in America*. London: Yale University Press, 1992.

[37] Edward D. Andrews. *The Community Industries of the Shakers*. (Reprint of New York State Museum Handbook 15, 1933), p. 88.

entrepreneurs fueled a revolution in water powered milling technology served as the model for the Shaker waterworks.[38] The successful construction of water-powered mills took a high degree of skill, and the mechanics that built them were called millwrights.[39] The Shaker waterworks automated mills and workshops for cutting lumber and stone, grist milling, blacksmithing and forging agricultural implements and other apparatuses, tanning, and processing agricultural products into manufactured goods and consumables. The waterworks also supplied quality water for domestic uses, fire protection, and for the automation of the washhouses and light handicraft workshops. In 1853, Hervey Elkins described how waterpower was extensively utilized in the Shaker mills and workshops at Enfield, New Hampshire. According to Elkins, "The sisters weave, wash, press and iron their clothes, churn, knit shirts and drawers and sew by water; and when I left, a brother was making a machine for rolling pastry. The brethren saw and plane lumber, thresh grain, shell garden seeds and corn, saw firewood, etc. by the same power."[40]

Early Shaker waterpower technology between 1787 and 1840 was an improvement over human labor and animal power, but the mills were unreliable and required a large investment of labor to construct. The technology developed by the Shakers between 1840 and 1865 was more efficient, but required greater capital expenditure. These later works were often tied to water sources outside the family and occasionally outside the watershed basin. By the 1860s, steam engine technology began to compromise the Shaker exclusive use of waterpower and created a dependence on the outside world.[41]

Mount Lebanon Shaker Village lies between regions of Dutch and English colonial influences. The Dutch contributed to American engineering by introducing millwright skills into the Hudson River Valley during the 1600s.[42] While early processing industries at Mount Lebanon depended on waterpower, there were no reliable naturally flowing streams within the Shaker village that could used for a millstream. The only stream large enough to provide a source of power was at the bottom of the mountain near the swamp, where Shaker convert Jonathan Walker built a saw mill. Initially, the Shakers employed waterpower only for wood sawing. The first mention of a water powered sawmill is in 1796. By 1809, there is record of a fulling mill and a community carding machine operated by waterpower. The Shakers pooled their resources in 1825 and hired Moses Johnson to build a millpond and a gristmill where Cherry Lane crosses the stream above Walker's sawmill southwest of the North and Church Families.[43] Johnson employed

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[38] Louis C. Hunter. *Waterpower: A History of Industrial Power in the United States, 1780-1930.* (Charlottesville: Univ. Press of Virginia, 1979), p. 47. [Cited In Korobov, 1989:26].
[39] Barbara R. Robertson. *Saw Power, Making Lumber in the Sawmills of Nova Scotia.* (Halifax: Nimbus Publishing Limited, 1986.), p. 22-28.
[40] June Sprigg. *By Shaker Hands.* (New York: Alfred A. Knof Inc., 1975), p. 147.
[41] Andrew John Vadnais. *Machines Among The Shakers: The Adoption of Technology By The Mount Lebanon Community 1790-1865.* (Wilmington, DE: University of Delaware: Master of Arts Thesis,1990), p. 12-18.
[42] Ibid.
[43] William L. Lassiter. *Shaker Architecture.* New York: Bonanza Books, 1962. "The Shakers had among them men of much experience in construction work. From the Shaker Manifesto, the monthly journal,

similar millwright skills to Walker, using massive stone slabs quarried from rock outcrops in the rough terrain near the mill to construct the dam. A few slabs forming the top of the dam and doubling as a bridge for the Cherry Lane to cross the streambed are eighteen feet long by twelve feet wide and two feet thick, weighing nearly eight tons.[44] The mill was durable but it did not satisfy all the needs for a gristmill as the flow was inadequate to power the original overshot waterwheel.[45] These mills continued in operation into the 1860s.[46] The Walker mill dam is mostly intact although the millpond is silted in. The Moses Johnson dam effectively withstood two centuries of torrential flooding but now is a ruin of massive stones slumped down into the streambed appearing for what could easily be mistaken as a work of nature.

Community records reveal that the water-power system at the Church, Center, and Second Families of Mount Lebanon was the work of only a few Brothers, namely Henry Bennet, Luther Copley, Amos Stewart, Daniel Crosman, and Bramin Wicks.[47] Their knowledge likely derived from books and periodical to which they subscribed (such as the *Journal of the Franklin Institute* and *Scientific America*) as well as their own practical experience associated with wood and grain processing industries.[48] This knowledge was

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autobiographies and biographies, research discloses that 'master builders' or architects, possessed extraordinary ability, and what is left for inspection attests to this claim."

[44]Andrew John Vadnais. *Machines Among The Shakers: The Adoption of Technology by the Mount Lebanon Community 1790-1865.* (Wilmington, DE: University of Delaware: Master of Arts Thesis, 1990).

[45] Jeanne Keefe-Watkinson. "Mount Lebanon Shaker Village." Unpublished Master Thesis, RPI, Troy New York, n.d., p.16.

[46] Jim Maczek. Personal communication by email, August 12, 2009. Jim described the area surrounding the mill area as very posh up to the 1860s.

[47] Luther Copley and Henry Bennet died of natural causes in the Spring of 1881. Cited in Andrew John Vadnais. *Machines Among The Shakers: The Adoption of Technology By The Mount Lebanon Community 1790-1865.* (Wilmington, DE: University of Delaware: Master of Arts Thesis, 1990), p. 12-18.

[48] Isaac N. Youngs. "A Domestic Journal of Daily Occurrences," microfilm copy. (New York State Museum, MSS. No. 13500, Albany, NY, 1834-1846). Cited in Andrew John Vadnais. *Machines Among The Shakers: The Adoption of Technology By The Mount Lebanon Community 1790-1865.* (University of Delaware: Unpublished Master of Arts Thesis, 1990s), p. 14.

The following are selected passages from "Domestic Journal" relating to the Church Family mill construction in 1835-36:

*Some hands employed in digging for the new mill foundation.

*We raised the new sawmill today….

*The long aqueduct at the new sawmill was put into the ground—170 feet long.

*The brethren had remarkable success in getting the mill pond cleared out last week getting the aqueduct scoured & covered, & the dam in situation that it might be left thro the winter.

* The new wood sawmill was started a little for trial, but t require considerable alteration, before it will answer.

* Having accomplished some alterations, the workman tried our new wood mill again, but it is found impractical to make it go without a change in the gearing and lessoning the speed.

* The new wood mill was tried again today, but after running but a minutes, one of the cast iron shafts broke; so now no more can be done till a new wro't iron shaft is made. The mechanics generally turned out to work at the fire wood.

* The new wood mill was again started P.M. It appears now that it may do some business.

* Joseph Wicker & Harisson Cohoon were here from Hancock, viewing our new mill.

* We sawed 28 common logs in the day time.

also augmented by trips to see other mills and the helpful advice of skilled hired laborers.[49]

While the waterworks developed by Bennet, Copely, et. al., were an improvement over animal power, they were unreliable and required extensive maintenance. Wood sawing was confined to spring months while melting snow on the mountain provided a continuous supply of water. Running the "big mill" would "saw the water out." Maintenance of the millstream was burdensome. Brethren stayed up many winter nights "applying rock salt" in an effort to keep the waterwheels and conveyance piping from freezing, but nevertheless, "breakages and stoppages occurred frequently."[50] Upgrading the mills and the bulky 'waterworks' was a drain on the community resources, as Youngs indicates with his comments about gristmill improvements in his discussion of partially underground aqueduct that was typical of those found at other Shaker mills:

> Remarks on the Millwork—On...the 22nd the canal broke: it was concluded best to put in an aqueduct to reach to the pond..... The whole length of the aqueduct was 405 feet, that in the canal 208. It took 272 bands weighing about 2,919 pounds, and it was about 40 days work to make them. 8 days work to make the various bolts and 8 days work to make the regulator works [gate valves] &c &c, so that reckoning 8 days work more for banding the trunk &c—the blacksmith work amounted to just about 64 days of work, so says Hiram Rude. The making of the water arm and its appendages judged to be about a fortnight's work. Henry Bennet worked there very steadily about three months.... Putting all this together it would amount to about 518 days work at the gristmill work, one side of what we, the Ch.h did in team work &c &c in digging the canal....[51]

Six of the eight "Families" located within the Mount Lebanon Shaker Village are within three separate watershed basins. Each watershed basin contributed uniquely in the development of the several waterworks created within the village. Waterworks generally are limited to the particular basin in which it is located. It is unusual to carry water from one basin into another, although the North Family apparently did so. The waterworks system, therefore, is dependent upon the characteristics of the watershed basin within which it is created. The three basins are of about equal size, each watershed is an area of approximately 700 acres lying between pairs of drainage divides. The ridges between basins are natural features of the landscape from where water moves inward toward the center of the basin and downhill by sheet flow called "drifts" and through stream

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> * Our sawmill has been undergoing a reformation, and was started again today. The alteration consists in the hollow arm, running vertically instead of horizontally. There is now no belt or gearing about it. It does well. Luther C. has done the work chiefly, Henry Bennet some.

[49] Andrew John Vadnais. *Machines Among The Shakers: The Adoption of Technology By The Mount Lebanon Community 1790-1865*. (Wilmington, DE: University of Delaware: Master of Arts Thesis,1990), p. 12-18.

[50] July 25, 1837: "Two leaks in our aqueducts mended yesterday & today. We have a great deal of trouble with our aqueducts." October 31, 1837: "Times seem to be rather hard with us now days, we have a great abundance of business on hand, that it seems impossible to know which way to turn. Our work at the grist mill bears very hard upon us, being late & a great deal to do; the misfortune in the breaking of the canal & having a long additional tube to put in, has rendered the case almost distressing.... Among the rest we are greatly afflicted with our aqueduct—by leaks &c."

[51] Youngs, "Domestic Journal," Supplement to December 1837.

channels. The water falls as rain or wells up from the ground as springs and seeps and flows down the mountain through the drainage basins and empties into the swamp in the valley bottom.

Archeologist, David Starbuck stated, "...in the total absence of naturally occurring bodies of water, the scale at which they undertook their new mill system was bold and far-sighted."[52] Water coming down from the mountain is a latent source of power. The Shakers understood the potential for harvesting waterpower energy and worked for about a century "re-plumbing" Mount Lebanon to bring waterpower to mills and workshops within the village. They dug ditches across the mountain slopes, built stone walls along the contours, and diverted springs and seeps into streambeds to divert water coming down from the mountain into the larger millstreams. Along the millstreams, they constructed earthwork embankments and stone dams to impound water in millponds, one below the other. They used the release of this captured water, conveyed through flumes and pipes, to turn the waterwheels (later turbines), that in turn operated pulleys and belts to mechanize the sawmills and gristmills, lathes, planers, washing machines, and many other apparatuses in the Shaker workshops.

Before the HALS project of 2009, the waterworks of the North Family, Mount Lebanon Shaker Village had not been professionally documented. Thomas Donnelly and Jim Maczek had conducted a broad survey of the waterworks, but how the waterworks functioned within the North Family was uncharted. Mount Lebanon experienced the most significant rainfall in local memory during the summer of 2009, illuminating much of the hidden waterworks. One particular rainstorm on July 31 flooded the village and revealed the locations of the stone aqueducts buried beneath the village by pushing water from the aqueducts up through the sod above the capstones. The HALS team used a pipe locator to track buried metal piping within the village. Historic research supplemented the field studies of the HALS team. The 1930s and 1940s HABS drawings and entries in the Shaker Journals were particularly useful in documenting the North Family hydraulic systems. One immediate benefit of the project was the discovery of an open 15-inch cast iron pipe leading into the Brethren's Workshop from the North Family Upper Pond that was flooding the basement during times of heavy rainfall. By sealing off this source of water the Shaker Museum and Library eliminated the destructive source of water flooding the basement.

According to the Brethren's Journal entries and historic HABS photographs and drawings (HABS NY-3253), willows were planted around many of the village's reservoirs and ponds including some of the North Family millponds as well as its reservoir.[53] Willows

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[52] David R. Starbuck. "The Shaker Mills in Canterbury, New Hampshire," *Journal of the Society for Industrial Archaeology*, vol. 12, no. 1 (1986): 17. Cited in Andrew John Vadnais. *Machines Among The Shakers: The Adoption of Technology By The Mount Lebanon Community 1790-1865.* (Wilmington, DE: University of Delaware: Master of Arts Thesis, 1990), 12.

[53] 1867 nov: Set row trees along fence upper side U[nion]. G[rove]. Locust & White Willow and a row White in Spencer garden. [NN, Shaker Collection, mss. No 20].
1878 feb 18: Cut tops of Willows by stone barn road. [NN, Shaker Collection, mss. No. 20].

were selected for their ease of propagation and the traditional belief that their roots would stabilize an exposed bank and prevent erosion. Mature willows were usually pollarded, perhaps to promote soil retention while preventing damage from tree throw, or to promote the growth of useful willow whips, and/or to reduce the amount of leaf litter that could clog the waterworks. The pollarded willow trees may represent another Dutch influence on the Shakers. Pollarded willows have historically lined many canals in the Netherlands, and these beloved Dutch trees have even been the subject of some of Vincent Van Gogh's art. By the 1890s, the Brethren were questioning the desirability of having willows growing around the ponds but did not describe why. While historically it was thought that willow roots strengthened earthen dams, engineers today recommend against planting anything but grass.

The Shakers constructed stone aqueducts where the millstreams passed through the village to take them underground where they would neither require bridges at crossings nor interrupt the continuity of the land surface. The millstream was not enclosed in stone aqueducts above or below the village, where they ran above ground through natural or partly-modified streambeds. The Shakers excavated the stream channels to the bedrock, which was relatively close to the surface here. Where the depth to bedrock was deep, large flat stone slabs were laid for a base. They lined the sides with stone walls that were then spanned with large, flat capstones of a general width of six feet. Burying the aqueducts underground and covering them with soil made it possible to plant a garden and walk unencumbered above them.[54] The best example is the stone aqueduct that runs below the North Family Kitchen Garden.

A so-called "caboose" or rectangular opening to the surface was inserted within the aqueducts during construction or at a later time. The purpose of these openings has not been established, but they may have served as clean-out points, similar to a modern day catch basin in municipal street drains. Oliver Evans gave provided another use of such openings within aqueducts in his 1795 *Young Mill-Wright & Millers Guide*:

> When water is to be conveyed under ground, or in a tight trunk below the surface of the water in a reservoir, to any considerable length, there must be air-pipes (as they have been called) to prevent the trunk from bursting. To understand their use let us suppose a trunk 100 feet long, 16 feet below the surface of the water, to fill which we draw a gate at one end of equal size with the trunk. Then the water, in passing to the other end acquires great velocity if it meets no resistance, which velocity is suddenly to be stopped when the

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1878 may 28: Set Willows round U[pper] pond above B[rothers]. Shop. [NN, Shaker Collection, mss. No. 20].
1886 jan 16: Cut Willows on Upper Pond, all round – Trim. [NN, Shaker Collection, mss. No. 20].
1886 nov 5: Working on dam on the hill. Trim willows and use them on the banking. [NN, Shaker Collection, mss. No. 20].
1891 dec 9: Begin cutting willows in nursery round pond. [NN, Shaker Collection, mss. No. 20].
1894 aug 3: Getting willow trees out of the upper pond they were cut and fell into the water last spring, and was a very great mistake. [NN, Shaker Collection, mss. No. 20].

[54] While the aqueducts were buried, much of the system was not deep enough to be below the frost line. In addition, other portions of the water system remained open aboveground.

> trunk is full. This great column of water in motion, in this case, would strike with force equal to a solid body equal weight and velocity, the shock of which would be sufficient to burst any trunk that ever was made of wood. Many having thought the use of these pipes to be left out of the air, have made them too small, so that they would vent considerable velocity, but would not vent the water fast enough when full, to check its motion easily, in which case they are worse than none at all, for if the air cannot escape freely, the water cannot enter freely.... Therefore I do conclude it best, to make an air-pipe for every 20 or 30 feet, of the full size of the trunk; but this will depend much on the depth of the trunk below the surface of the reservoir, and many other circumstances.[55]

Field observations suggest that the aqueduct running beneath the North Family Kitchen Garden has at least one blockage above a caboose, and during a large rainstorm on July 31, the HALS field team observed the aqueduct explode after it became clogged with gravel. This demonstrates the importance of both keeping the aqueducts clear and properly vented.[56]

Water was drawn from the millponds through wood sluices, hollowed out logs, and metal pipes into the Shaker mills and workshops to turn waterwheels and turbines for powering large cutoff saws, jigsaws, planers, turning lathes, grinding wheels, trip hammers, washing machines and other mechanical apparatuses of the Shaker industries. The millstream design enabled the Brethren to operate mills and workshops for longer periods of time than would be possible from a single millpond. For example, the Lumber and Grist Mill below the middle millpond in the North Family would have an operating time based on the capability of all the millponds upstream from the mill site. When water was depleted from the middle millpond the standpipe in the upper millpond was opened to release water underground through the stone aqueduct to refill the middle millpond. When water was depleted from the upper millpond the standpipe in the Church Family millpond was opened to release water downstream. When water was depleted from the Church Family millpond the standpipe in the lower millpond in the Church Family was opened to release water downstream. And finally, when water was depleted from the lower Center Family millpond the standpipe was opened in the upper millpond to release water downstream to the North Family mill. Drawing water down each consecutively lower millpond one after another enabled the Brethren to prolong their milling and workshop activities for long periods until the water was depleted.

Millponds served both as a source of water to power mills and workshops, and as water source for agricultural uses. Farm use of millponds contaminated the water making it unsuitable for domestic use and consumption. The Church and Center Families developed a secondary water source of crystal clear mountain spring water for their domestic use. The Center Family also used this pure water in its herbal medicine processing industry. Darrow School continues to use the same source of water today for

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[55] Oliver Evans. *The Young Mill-Wright & Millers Guide*. (Philadelphia: Self Published, 1795), p. 123-127.
[56] The journal entries Vaughn included in her appendices III, IV and V contain references to flooding on the property and dams. Becky Vaughn. "An Analysis of Shaker Artifacts, The North Family, Mt. Lebanon, New York." (Unpublished manuscript prepared for Prof. Michael Coe, Yale University, Spring Term, 1986.).

domestic uses and fire protection. The North Family followed suit of the Church and Center Families and developed its own secondary source of mountain spring water for domestic uses and fire protection.

The North Family used water in many ways beyond waterpower for mills and workshops. Pure water from mountain springs was conveyed by piping into holding and settling cisterns for domestic use in the kitchens of dwellings such as the First Dwelling House as described in this undated historic Shaker account, "We have plenty of hot and cold water in the various departments. We have also another model arrangement—a cooling room on a level with the kitchens which saves much backache and weariness, answering the purpose of a refrigerator or down-stairs cellar. It is built of stone, by the sides are coils of iron pipe through which the cold mountain water circulates and then passes into two large Portland cement sinks, where we set away the food in earthen crocks. We find it keeps better than when we put it on ice."[57]

Brethren's Journals and Gardener's Journals record the great effort expended by the North Family to create a reliable water collection and distribution system within the residences, workshops and farm. It was said that "Shaker water wasn't any good when they were done with it because it was all worn out."[58] Rainwater diverted from the roofs of the buildings through piping underground led out to the barns for the livestock and into cisterns for wash water. The Brethren threaded piping up through chimneys to run heated water out to the watering tanks in the barnyard to keep the drinking water for livestock from freezing. A pond was dug on the mountainside to supply pressurized water for fire protection, and five fire hydrants were placed around the buildings. The pressure was high enough to spray the water above the roof tops.[59] This same source of water was piped into the Second Wash House to turn the turbine that created power for washing machines and mechanized workshops located in the building. Water used to turn the turbine was re-conducted to the barns and barnyards for watering livestock. From there, the water was conducted by drain tiles and released into gardens and orchards as irrigation, and out again to the lower millpond, from where it would be used to power a mill, and out again into the natural streambed down the mountain into the Shaker Swamp in the valley bottom where suspended solids would be released as a source of fertilizer for the growth of natural vegetation, which cleaned the water before releasing it downstream into the river on its course to the Hudson River and out into the Atlantic Ocean and the recurring hydraulic cycle.

By the time the last Shaker left the Mount Lebanon Shaker Village in 1947, the North Family waterworks were in a deteriorating state of disrepair. The millponds had been

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[57] *Vegetarianism Among Shakers.* Republished from *The Counselor*, North Family Mount Lebanon, N.Y., n.d., p. 4. Reproduced by the Shaker Heritage Society, Albany, N.Y. by permission, from the original in the Special Collections of the New York State Library.
[58] June Sprigg. *By Shaker Hands.* (New York: Alfred A. Knopf, Inc., 1975), p. 146.
[59] 1875 sep [i.e., oct 27]: Hydrants throw water above all buildings. [NN, Shaker Collection, mss. No. 20]

silted in or drained, and the aqueducts and pipelines connecting them had been damaged by both natural and cultural forces.[60]

PART II. PHYSICAL INFORMATION

A. Landscape Character and Descriptive Summary: The Mount Lebanon Shaker Village is located in the State of New York extending into Massachusetts on the lower west slope of Mount Lebanon in the Taconic Mountain Range on the western edge of the New England Highlands. The physical advantages of the mountainside site are significant. The mountain above the village provided good water. The gently sloping terrace on which the village is located provided flat land for cultivation of field crops and gardens. The lower slopes elevated the village above the swampy valley bottom. The village is sited on the 1,000 foot above sea level. Slopes descend from the village westward into the Shaker Swamp in the Lebanon Valley to about 700-foot-above-sea level. Slopes ascend from the village eastward to 1,927 feet at the peak of the Holy Mount. Taller peaks rise to the northeast above 2,500 feet above sea level and continue rising to the top of Mount Greylock, which is the highest land mass in Massachusetts. The village of New Lebanon is one mile northwest in the Lebanon Valley at about the 720 foot elevation. Hancock Shaker Village is about four miles east in the state of Massachusetts, and the city of Pittsfield, Massachusetts is nine miles east. Both are about 1,000 feet above sea level.

All six of the Mount Lebanon Shaker families are located within bands of what is considered prime farmland soil classified as Georgia silt loam. Soils above and below the families are less suitable for row crop agriculture and better adapted to pasturage and woodland.[61] Georgia silt loam soil is level to gently sloping, moderately deep, fertile, and a pH of neutral to slightly acidic. The soil is well suited for row crop production with few limitations, except at high elevations as described above where periodic frost damage will occur, and on the steeper slopes where erosion is the limiting factor. Seasonal wetness is a limitation on level areas, with soil compaction the major concern. The North Family laid many lengths of field drain tile to remove excess water from the fields. Natural depressions form isolated wetlands. Soil of five to fifteen percent slope requires conservation measures to prevent erosion, such as contour plowing and terracing. Soils exceeding fifteen percent slope are not suited for tillage and are better managed under a cover of shrub or as woodland. It was this combination of geographical, geological, and ecological factors such as elevation above sea level, soil characteristics, aspect of sun orientation and shelter from wind, with the agricultural and land management acumen of the Shakers and their industries that created the cultural landscape of the Mount Lebanon Shaker Village.

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[60] Coe, Michael D. Mt. Lebanon Shaker Village NEH Application. (September 30, 1986), p. 3.
[61] Case, Roger. *Soil Survey of Columbia County, New York.* United States Department of Agriculture, Soil Conservation Service, In Cooperation with Cornell University Agricultural Experiment Station, 1974.

B. Character Defining Features:

1. Spatial organization and Circulation: The North Family village rests on a series of terraces on the west-facing slopes of Mount Lebanon. Various buildings and landscape spaces occur upon these individual terraces as they progress down slope from east to west. The main roads, both of bituminous paving, Darrow Road to the east and Shaker Road to the west and south define spaces within the North Family area. The majority of the landscape rests within the "V" shape created by the intersection of these two roads south of the site. The remaining parts of the North Family landscape fall outside of this area on both the west side of Shaker Road and the east side of Darrow Road. A gravel drive enters the village from Shaker road, runs north toward the stone barn where it turns east just beyond the granary, and extends to Darrow Road. Stone paths run beside and between many of the buildings of the village.

2. Topography: The 1,000 foot above sea level contour is a significant elevation for agriculture in this region. Mountain weather becomes more variable in the higher elevation. Crops are at risk above 1,000 feet elevation from late spring and early autumn frost.[62] The Church Family is well-situated at 1,000-foot elevation with a favorably located broad area of agricultural land on lower slopes to the west and southwest. The Center Family is located at 1,040-feet elevation where row crop agriculture is somewhat limited. The Second Family is located at 1,080-foot elevation, and the South Family is higher at 1,180 feet. The agricultural land between them has moderate limitations for row crop agriculture due to the high elevation. The East Family is located at 1,240-foot elevation with severe limitations for row crop agriculture. The land is better suited for grain production and pasture. The North Family is favorably located at 960-feet elevation. A broad band of agricultural land is favorably located for row crop agriculture on slopes descending north and southwest. These soils have steeper slopes with greater limitations than the more level slopes in the Church Family, but the North Family under the farm management of Elder Frederick Evans terraced, walled, drained and composted to improve the soils and reduce the natural limitations to row crop agriculture.[63]

2. Vegetation: Regenerating forest is replacing old fields, pastures, and meadows, and erasing evidence of the Shaker pastoral landscape, yet one still finds old trees in the forest, with large, broadly spreading branches that only could have developed in the open and sunny area, such as along the edges of fields and in pastures and meadows. Today, these trees are surrounded by the emerging succession forest of crowded mast-straight trees. Further evidence that these isolated giants once grew in sunny open spaces are the long lines of stone walls

[62] Roger Case. *Soil Survey of Columbia County, New York.* United States Department of Agriculture, Soil Conservation Service, In Cooperation with Cornell University Agricultural Experiment Station, 1974.
[63] See Appendix Three for a description by Frederick W. Evans of his early life and experiences on an English Manor Farm where he experienced the scientific management of agriculture.

that formerly marked the boundaries of Shaker fields and pasture enclosures. These relics of the vanishing Shaker pastoral landscape run in geometric lines made by human hands through the spontaneous growth of new forest. The Shakers raised a cultural landscape upon the land and Nature is pulling it back into the earth again. Old post cards and photographs confirm that the Shaker cultural landscape was a village set in a mosaic of gardens, fields, orchards, pasture, meadow, woodland, ponds and streams.

3. Water: The North Family constructed mills and workshops within its boundary on a millstream shared upstream with the Church and Center Families. Three millponds were constructed within the North Family. Later the North Family also drew water through piping from the East Family outside their watershed basin. The Center and Church Families constructed multiple millponds.

   The upper millstream originated within the middle watershed basin on the mountain directly above the center of the village. Water flowed down the mountain through drifts and numerous small streams in a tributary pattern of ever increasing size downstream. The Shakers diverted smaller streams, seeps and springs into the larger millstream that previously flowed through the three families as a smaller natural stream. The first millpond on this millstream was constructed in the ravine on the upper hillside above the Center Family. A second millpond was constructed farther downstream in the Center Family where the slopes began to flatten out.

   The Center Family used the waterpower to mechanize mills and workshops for their herbal medicinal extract industry and then returned the water back into the millstream. Water released from the lower millpond in the Center Family was conveyed underground through a stone channel, or aqueduct, to the millpond in the Church Family (commonly called Tannery Pond today). The Church Family used the water to mechanize a tannery mill and then returned the water back into the millstream. Water released from the millpond in the Church Family was conveyed underground through a stone aqueduct to the upper millpond in the North Family. Water from the upper North Family millpond was conveyed underground through an aqueduct to the family's middle millpond. Water from the middle millpond was then conveyed underground through another aqueduct under the stone dam into a natural streambed along the south side of the Lumber and Grist Mill, where it flowed downstream as an open channel into the lower millpond. It is not known why water was retained in this lower millpond or how it was released to continue on its course down the mountain to the Shaker Swamp in the valley bottom.

PART III. SOURCES OF INFORMATION

A. Bibliography:

**Primary and Secondary Sources**

Account book of the extract herb industry, Church Family, New Lebanon, 1860-1862, Andrews Collection, Henry Francis du Pont Museum, Winterthur.

*American Journal of Pharmacy*, n.s. 18 (1852), American Pharmaceutical Association, Washington, D.C.

Anderson, Russell H. "Agriculture Among the Shakers, Chiefly at Mount Lebanon," *Agricultural History*, 24 (July 1950).

Andrews, Edward D. *The Community Industry of the Shakers.* Albany: University of the State of New York, 1932. New York State Museum. Handbook 15.

Andrews, Edward D. *The People Called Shakers.* New York: Oxford University Press, 1953.

Andrews, Edward Deming Faith Andrews. *Work and Worship among the Shakers, Their Craftsmanship and Economic Order.* Greenwich, CT: New York Graphic Society, 1974.

Andrews, Edward D. and Faith Andrews. *Fruits of the Shaker Tree of Life: Memories of Fifty Years of Collecting and Research.* Stockbridge, MA: Berkshire Traveler Press, 1975.

Bell, Andrew. "Men and Things in America," In Glendyne R. Werland. *Visiting the Shakers, 1778-1849.* Clinton, NY: Richard W. Couper Press, 2007.

*Book of Records, North Family, Mount Lebanon, 1814-1910.* Shaker Collection, New York Public Library, Manuscript Number 20. [Stewart, Philemon].

Brewer, Priscilla. *Shaker Communities, Shaker Lives.* Hanover and London, University Press of New England, 1981.

Brown, Thomas. *An Account of the People Called Shakers: Faith, Doctrines, and Practice, Exemplified in the Life, Conversations, and Experience of the Author during the Time He Belonged to the Society, to which is affixed a History of Their rise and Progress to the Present Day.* Troy, NY: Parker and Bliss, 1812.

Bullard, Harriet. *A Diary Commenced by H.B.*, Jn. 1, 1859 – July 31, 1863. Shaker Museum and Library, Old Chatham, NY, Manuscript No. 21.

Bullard, Sister Marcia, "Shaker Industries," *Good Housekeeping* 43(July 1906).

Burns, Ken and Amy Stechler Burns. *The Shakers: Hands to Work, Hearts to God.* Florentine Films, PBS, 1989.

Bushnell, Richard, Mount Lebanon, NY, to [Ministry, Mount Lebanon, NY], January 1860. NOC, mss. No 12174 (Cited In Jerry V. Grant. "The Social History of the North Family Shakers 1800-1947," In Page Ayres Cowley Architects, Historic Structures Report: North Family and Second Meetinghouse, Mount Lebanon Shaker Village. (September 20, 2003).

Carter, Catherine and Martha Geores. "Heaven on Earth: The Shakers and their Space," *Geographies of Religions and Belief Systems,* 1 (October 2006).

Case, Roger. *Soil Survey of Columbia County, New York.* United States Department of Agriculture, Soil Conservation Service, In Cooperation with Cornell University Agricultural Experiment Station, 1974.

"Character of the Shakers," *Boston Weekly Magazine*, In Glendyne R. Werland. *Visiting the Shakers, 1778-1849.* Clinton, NY: Richard W. Couper Press, 2007.

Coe, Michael D. Mount Lebanon Shaker Village NEH Application. September 30, 1986.

Dixon, Hepworth. *New America.* Philadelphia: J.B. Lippincott & Co., 1867.

White, Anna. *Vegetarianism Among Shakers*. Republished from "The Counselor," 1847-1879. North Family, Mount Lebanon, N.Y.

Elders' Journal. Transcribed extracts by Jerry V. Grant, Shaker Library, Sabbathday Lake, Maine. Manuscript Number 10-0J-010.

Emlen, Robert P. *Shaker Village Views: Illustrated Maps and Landscape Drawings by Shaker Artists of the Nineteenth Century.* London: University Press of London, 1987.

Evans, Frederick W. *Autobiography of a Shaker, and Revelations of the Apocalypse.* New York: American News Company. 1869.

Evans, Frederick W. *Book of Records.* Transcribed extracts by Jerry V. Grant. Shaker Museum & Library, Old Chatham and New Lebanon, NY.

Evans, Frederick W. *Elder's Journal.* Transcribed extracts by Jerry V. Grant. Shaker Museum & Library, Old Chatham and New Lebanon, NY.

Evans. Frederick. Private Notebook 1861-1892. Henry Francis du Pont Winterthur Museum, Winterthur, DE.

Evans, Oliver. *The Young Mill-Wright and Miller's Guide.* Philadelphia: Self Published, 1795.

*Gardeners' Journal.* North Family, Mt. Lebanon, NY. Aug. 17, 1849 – April 17, 1851. Shaker Museum and Library, Old Chatham and New Lebanon, NY.

Gifford, Don (ed.). *An Early View of the Shakers, Benson Lossing and the Harper's Article of July 1857.* Hanover, NH and London: University Press of New England, 1989.

Grant, Jerry V. "The Social History of the North Family Shakers 1800-1947," in Page Ayres Cowley Architects, Historic Structures Report: North Family and Second Meetinghouse, Mount Lebanon Shaker Village. (September 20, 2003).

Green, Calvin and Seth Y. Wells (eds.). *Shakers, A Summary of the Millennial Church, or United Society of Believers, Commonly Called Shakers. Comprising the Rise, Progress and Practical Order of the Society, together with the General Principles of their Faith and Testimony.* Second Edition. Albany: C. Van Benthuysen, 1848.

Greenwood, Richard. Mount Lebanon Shaker Society, National Registry of Historic Places Inventory – Nomination Form. Washington: National Park Service, 1983.

Heritage Landscapes, LLC. (Patricia M. O'Donnell, FASLA, AICP, Laurie Matthews and Glenn T. Stach). *North Family Mount Lebanon Shaker Village Cultural Landscape Report.* Charlotte, VT, 2003 (Prepared for Shaker Museum and Library, with plans by Cooper, Robertson & Partners, New York, NY, Based on Topographical Survey by Clark Engineering and Surveying, New Lebanon, NY). © 2003. All rights reserved.

*Holy, Sacred and Divine Roll and Book; from the Lord God of Heaven, to the Inhabitants of Earth: Revealed in the United Society at New Lebanon, County of Columbia, State of New York, United States of America.* Canterbury, NH: The United Society, 1843.

Hunter, Louis C. *Waterpower: A History of Industrial Power in the United States, 1780-1930.* Charlottesville: Univ. Press of Virginia, 1979.

Janzen, Donald. *The Shaker Mills on Shawnee Run: Historical Archaeology at Shakertown.* Harrodsburg, KY: Pleasant Hill Press, 1981.

Keefe-Watkinson, Jeanne. *The English Arts and Crafts Movement: Appropriate Technology in the Nineteenth Century.* Master Thesis, Rensselaer Polytechnic Institute, Troy New York, 1988.

Kirk, John T. *The Shaker World: Art, Life, Belief.* New York: Harry N. Abrams, 1997.

Knight, Jane. *Jane Knight's Journal*, 1833-1839. Shaker Museum and Library. Manuscript Number 10362.

Korobov, Stephanie. Mount Lebanon Church Family Water Power System. Unpublished M.A. Thesis, Yale University, 1989.

Lassiter, William L. *Shaker Architecture*. New York: Bonanza Books, 1962.

Macaulay, David. *Mill*. Boston: Houghton Mifflin, 1983.

Meader, Robert F. W. "Zion Patefacta," *The Shaker Quarterly* 2 (Spring 1962).

Melcher, Marguerite F. *The Shaker Adventure.* Princeton, NJ: Princeton University Press, 1941.

Mesick, John. The North Family Complex of the Mount Lebanon Shaker Village: The Site of a New Museum. Trustees of the Mount Lebanon Shaker Village, January 2000.

Miller, Amy Bess. *Shaker Herbs: A History and a Compendium.* New York: Clarkson N. Potter, Inc., 1976.

Miller, M. Stephen. *From Shaker Lands and Shaker Hands.* Hanover, NH and London: University Press of New England, 2007.

Morse, Flo. *The Shakers and the World's People.* New York: Dodd & Mead Co., 1980.

*Manifesto.* 1870-1899.

Murray, Stuart. *Shaker Heritage Guidebook: Exploring the Historic Sites, Museums & Collections.* Spencertown, NY: Golden Hill Press, Inc., 1994.

New York State Museum. *Community Industries of the Shakers: A New Look.* Albany, 1983.

Nichols, Thomas Low. *Forty Years of American Life, 1821-1861.* New York, 1937.

Niemcewicz, Julian. "Under Their Vine and Fig Tree; Travels through America in 1797-1799," In Glendyne R. Werland. *Visiting the Shakers, 1778-1849*. Clinton, NY: Richard W. Couper Press, 2007.

Oliver, Paul. "Perfect and Plain: Shaker Approaches to Design," In Mick Gidley with Kate Bowles (ed.). *Locating the Shakers: Cultural Origins and Legacies of an American Religious Movement*. Exeter: University of Exeter Press, 1990.

Page Ayres Cowley Architects, LLc. North Family and Second Meetinghouse, Mount Lebanon Shaker Village, New Lebanon, New York, Historic Structures Report, Prepared for Shaker Museum and Library Mount Lebanon Project. Final Submission, March 1, 2004.

Pearson, Elmer R., Julia Neal, and Walter Muir Whitehill. *The Shaker Image*. Boston: New York Graphic Society, 1974.

Promey, Sally M. *Spiritual Spectacles: Vision and Image in Mid-Nineteenth Century Shakerism*. Indianapolis: Indiana University Press, 1993.

Reynolds, Terry. *Stronger than a Hundred Men: The History of the Vertical Water Wheel*. Baltimore: John Hopkins Univ. Press, 1983.

Robinson, Barbara R. *Saw Power, Making Lumber in the Sawmills of Nova Scotia*. Halifax: Nimbus Publishing Limited, 1986.

Silliman, Benjamin. "Remarks made on a Short Tour between Hartford and Quebec, in the Autumn of 1819," In Glendyne R. Werland. *Visiting the Shakers, 1778-1849*. Clinton, NY: Richard W, Couper Press, 2007.

Sizer, Daniel. *Elders' Journal*. Commenced by Daniel Sizer 1838 – 1847. North Family, Mt. Lebanon, NY. Shaker Museum and Library, Old Chatham and New Lebanon, NY. Manuscript Number 21499.

Society Record. *The Shaker Manifesto 9* (February 1879).

Sprigg, June. *By Shaker Hands*. New York: Alfred A. Knopf Inc., 1975.

Sprigg, June and David Larkin. *Shaker Life Work and Art*. New York: Stewart, Tabori & Chang, Inc., 1987.

Starbuck, David. *Canterbury Shaker Village, A Historical Survey*, Vol. 2. Durham: Univ. of New Hampshire, 1981.

Starbuck, David. "The Shaker Mills in Canterbury, New Hampshire," Journal *of the Society of Industrial Archaeology*, Vol. 12, No. 1, 1988.

Strickland, William. "Journal of a Tour in the United States of America, 1794-1795," In Glendyne R. Werland. *Visiting the Shakers, 1778-1849*. Clinton, NY: Richard W, Couper Press, 2007.

Stein, Stephen. *The Shaker Experience in America*. London: Yale University Press, 1992.

Stull, Scott D. Village Archaeological Sensitivity Assessment Report, North Family, Mount Lebanon Shaker Village, Town of New Lebanon, Columbia County, New York, HAA #2479, Submitted to: Cooper, Robertson and Partners.

Vadnais, Andrew J. *Machines Among The Shakers: The Adoption of Technology by the Mount Lebanon Community 1790-1865*. Master Thesis. University of Delaware, Wilmington, DE, 1990.

Vaillancourt, Dana. *Archaeological Excavations at the North Family Dwelling House Site*. Master Thesis. Rensselaer Polytechnic Institute Thesis, Troy, NY, 1983.

Vaughn, Becky. *An Analysis of Shaker Artifacts, The North Family, Mt. Lebanon, New York*. Unpublished manuscript prepared for Prof. Michael Coe, Yale University, Spring Term, 1986.

Warder, W.S. Warder. *A Brief Sketch of the Religious Society of People called Shakers*. (London, 1818).

White, Anna and Leila Taylor. *Shakerism: Its Meaning and Message, Embracing an Historical Account, Statement of Belief and Spiritual Experience of the Church from its Rise to the Present Day*. Columbus, OH: Press of Fred J. Heer, 1905.

Wiegand, Ernest A., II. Archaeological Investigations at the North Family Brethren's Workshop, Mount Lebanon Shaker Village, New Lebanon, New York. A Preliminary Report, 1985.

Youngs, Isaac N. *A Domestic Journal of Daily Occurrences, 1835-1846*. New York State Library, Manuscript Number 13500.

Zitzler, Paula A. *Waterpower at Hancock Shaker Village: A Study in Industrial Archaeology*. Master Thesis. Rensselaer Polytechnic Institute, Troy, NY 1985.

B. **Additional Sources Not Yet Investigated:** There are large collections of Mount Lebanon documents at the New York State Museum, Albany; the Williams College Library, Williamstown, Massachusetts; the Shaker Museum and Library, Old Chatham and New Lebanon, New York; the Western Reserve Historical Society, Cleveland, Ohio; the Henry Francis du Pont Winterthur Museum Library, Winterthur, Delaware; other

research institutions; and many other privately-owned sources. These include economic records, photographs, diaries, and other valuable sources for Mount Lebanon research. Some of these materials, such as those at the Western Reserve Historical Society are available on microfilm.[64]

During the 1930s and 40s, the Historical American Buildings Survey (HABS) prepared measured drawings of a number of the most significant Shaker structures at Mount Lebanon. While some of these have accuracy issues, for example the drawing set of the North Family Stone Barn (HABS NY-3251), they are invaluable for ongoing research.

## PART IV. PROJECT INFORMATION

The documentation of the North Family, Mount Lebanon Shaker Village was cosponsored by the Historic American Landscapes Survey (HALS) of the National Park Service, U.S. Department of the Interior; the Shaker Museum and Library, David Stocks, President; and the World Monuments Fund, Bonnie Burnham, President and CEO and Amy Freitag, Program Director of the United States. The National Park Service principals involved were Richard O'Connor, Chief, Heritage Documentation Programs; Paul D. Dolinsky, Chief, HALS; Christopher Stevens, Project Manager, HALS; and Matthew Stutts, GIS Specialist, HALS/Cultural Resources Geographic Information Systems. The documentation was produced during the summer and autumn of 2009 by David Driapsa, ASLA Florida, Field Project Supervisor; Alan Grosse, ASLA Florida; and Andrew Meessmann, Landscape Architecture graduate, Kansas State University. Photography was completed by James Rosenthal and Renee Bieretz, HALS Photographers.

The Shaker Museum and Library provided office space on site to the HALS team in the historic Forge. The Darrow School provided living quarters on site in the historic Sister's Shop that they lease from the Shaker Museum and Library. The duration of field documentation was from June 8 through August 28.

The Shaker Museum and Library also provided advisory and physical support for the project. Jerry Grant, Director of Research and Library Services, shared books, historic Journal entries (much that he transcribed from originals), maps, site plans, aerial and still photographs, as well as his broad knowledge of Shaker history. Dennis Dodge assisted the HALS Team in clearing vegetation to uncover sites for the investigation of hidden waterworks elements.

The project received broad support from the community with several individuals providing extensive information. Jim Maczek shared his extensive knowledge of the Mount Lebanon Shaker Village, its waterworks and history through personal visits, site orientations, drawings, maps, and books. Peter O'Hara shared aerial and still

[64] Coe, Michael D. Mt. Lebanon Shaker Village NEH Application. September 30, 1986.

photographs, maps and his personal knowledge of the site. Tom Seamon, Director of Facilities at Darrow School, shared historic and contemporary maps and drawings from the school archives and personal site orientations that contributed to an understanding of the Church and Center Family sites. Ellen Spear, Director of Hancock Shaker Village, Inc., and Leslie Hertzberg, Curator Manager, shared documentation of the waterworks of this nearby Shaker village that broadened the HALS Team knowledge of Shaker hydraulics. The Columbia County Soil & Water Conservation District at Ghent shared aerial photographs, most importantly the 1942 aerial that served as a Rosetta Stone for the project. Many other community members shared their knowledge of the site and while not named individually, their contributions are appreciated.

Figures:

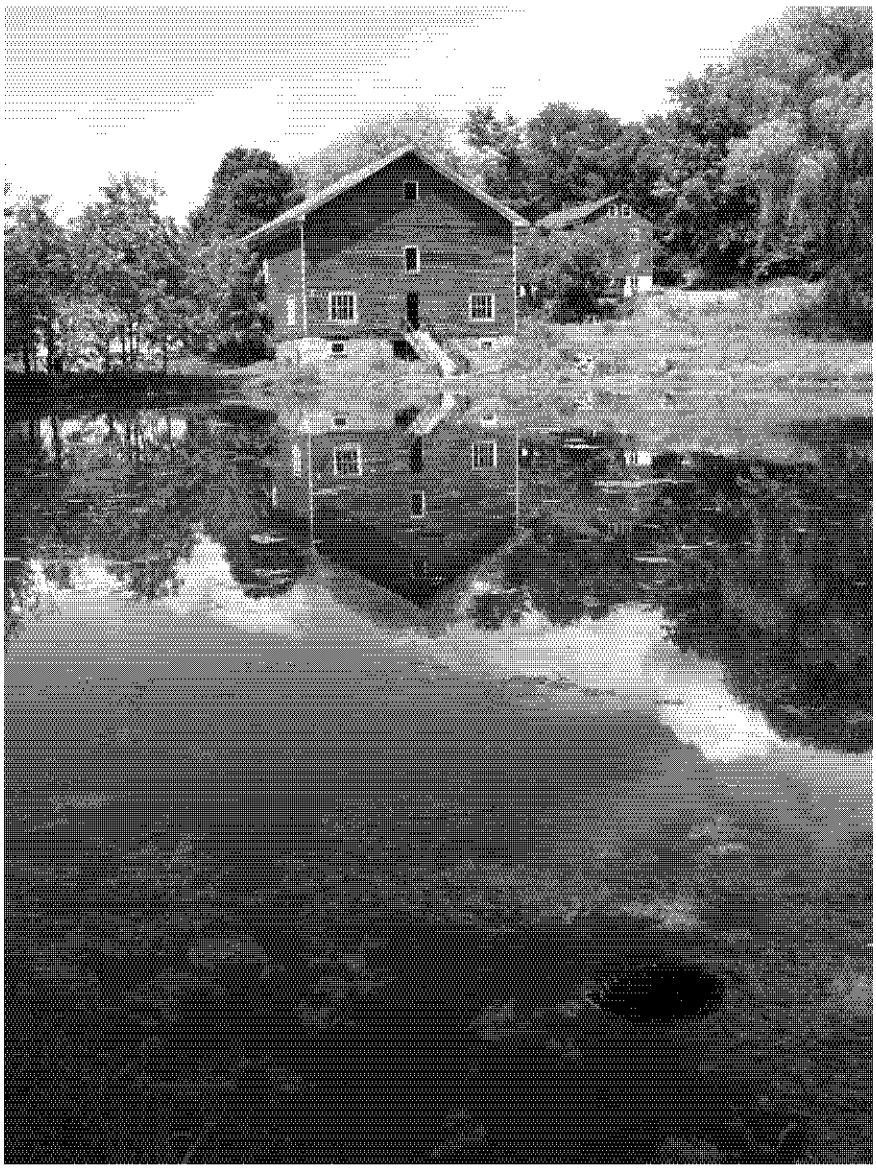

**Figure 1**: Millpond in the Center Family, a remnant historic millpond in the Mount Lebanon Shaker Village. (Photograph by David Driapsa).

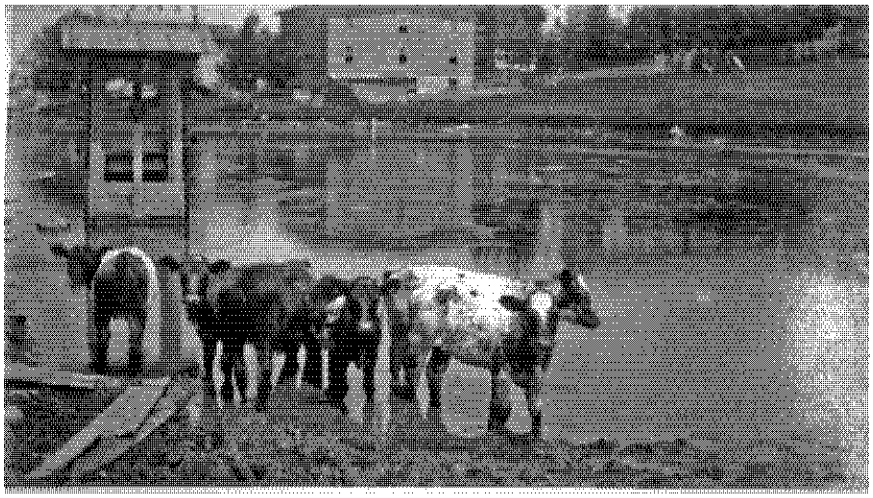

**Figure 2**: Millpond in the Center Family. This is the same view as in Figure One. The millponds served many functions in the Mount Lebanon Shaker Village, including a source of water for livestock, as seen here. (Photograph courtesy of Peter O'Hara).

**Figure 3**: Reservoir above the Center Family. Church and Center Families constructed the reservoir to hold potable water piped from springs above the village on the mountain. The pure water from this reservoir was used by the Shakers in processing medicinal herb distillations, domestic uses and fire protection. The historic reservoir, now altered, still provides water to the Darrow School for domestic uses and fire protection. (Photograph courtesy of Peter O'Hara).

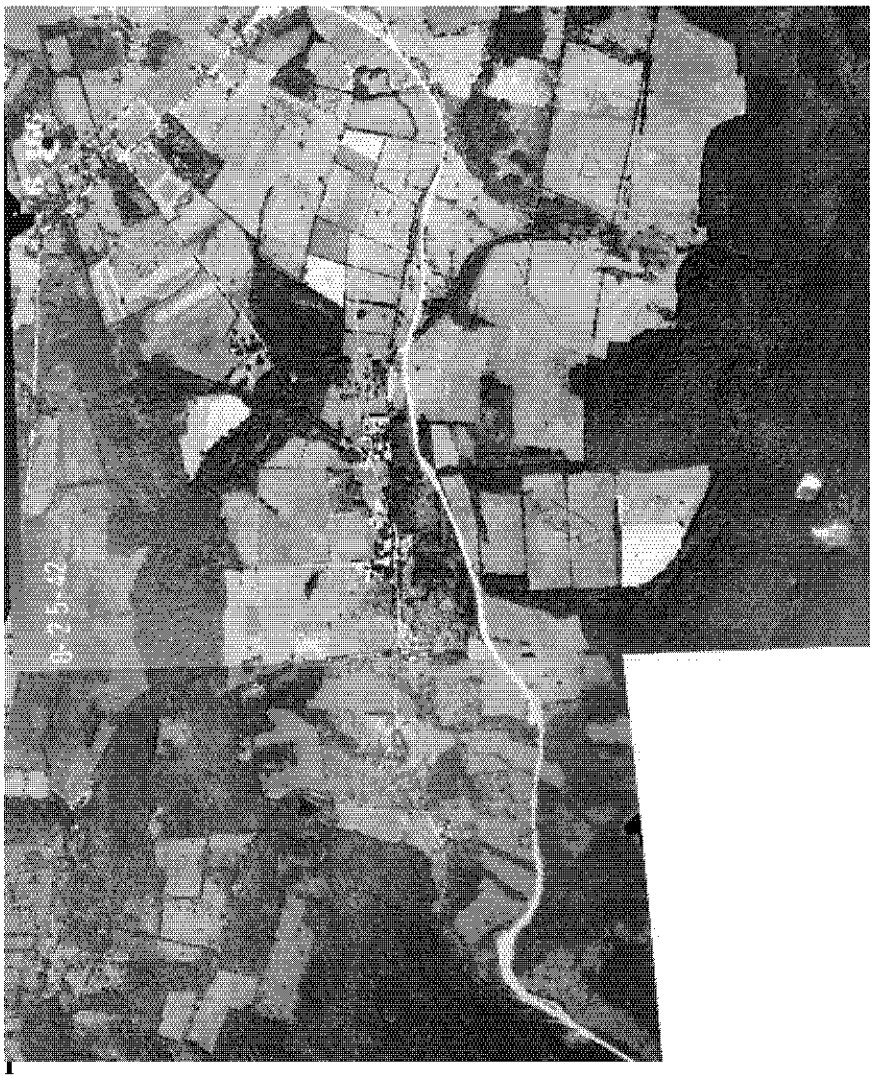

**Figure 4**: 1942 Aerial Photograph of the Mount Lebanon Shaker Village. The Shakers still occupied the North Family when this image was made. The Shaker cultural landscape is most extant at this time, as depicted in the village mosaic of tightly clustered buildings, surrounded by gardens, fields, pastures, meadows and woodlots, interspersed by millstreams and millponds. (Photograph courtesy of Doris Cady, the Columbia County Soil & Water Conservation District at Ghent, New York).

**Figure 5**: Drawing of waterworks in North, Church, and Center Families by Thomas Donnelly and Jim Maczek. (Plan courtesy of Jim Maczek).

**Figure 6**: HALS team measuring the standpipe in the middle millpond. (Photograph by David Driapsa)

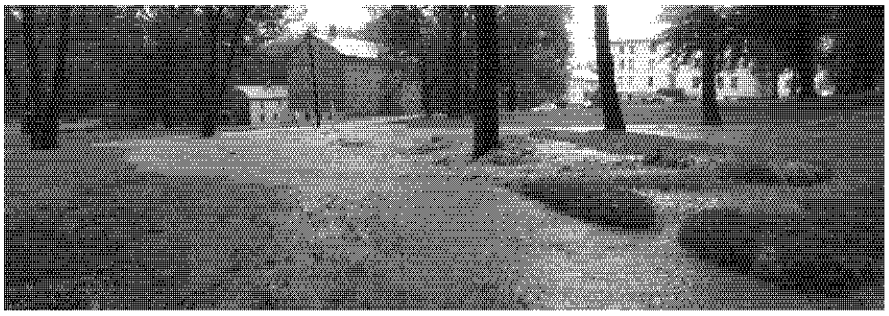

**Figure 7:** Kitchen garden aqueduct spilling water over the north family site during the severe rain event of July 31, 2009. (Photograph by Alan Grosse).

**Figure 8:** View inside the Lumber and Gristmill aqueduct beneath the North Family Middle Millpond Dam. This channel is about five feet high and three feet wide. (Photograph by Alan Grosse).

**Figure 9**: This image is an existing conditions view of the "Caboose" located near the Forge. This structure is a vertical opening in the Kitchen Garden aqueduct. (Photograph by Alan Grosse).

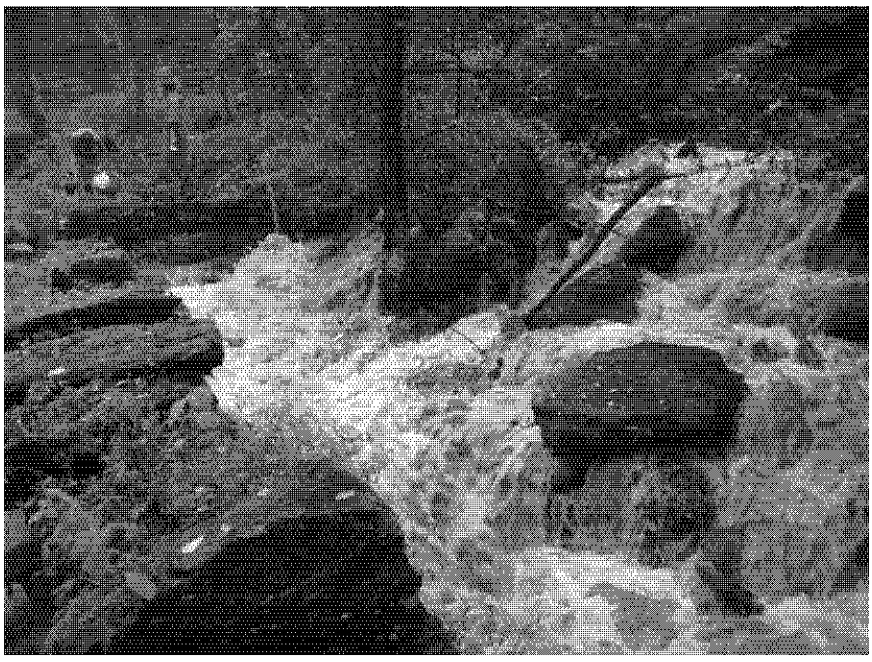

**Figure 10**: View looking south over the Sawmill and Gristmill site during the severe storm event of July 31, 2009. The HALS Team is documenting the flooding. (Photograph by David Driapsa).

**Figure 11**: This image is an existing conditions view of the standpipe in the North Family Upper Millpond. (Photograph by Alan Grosse).

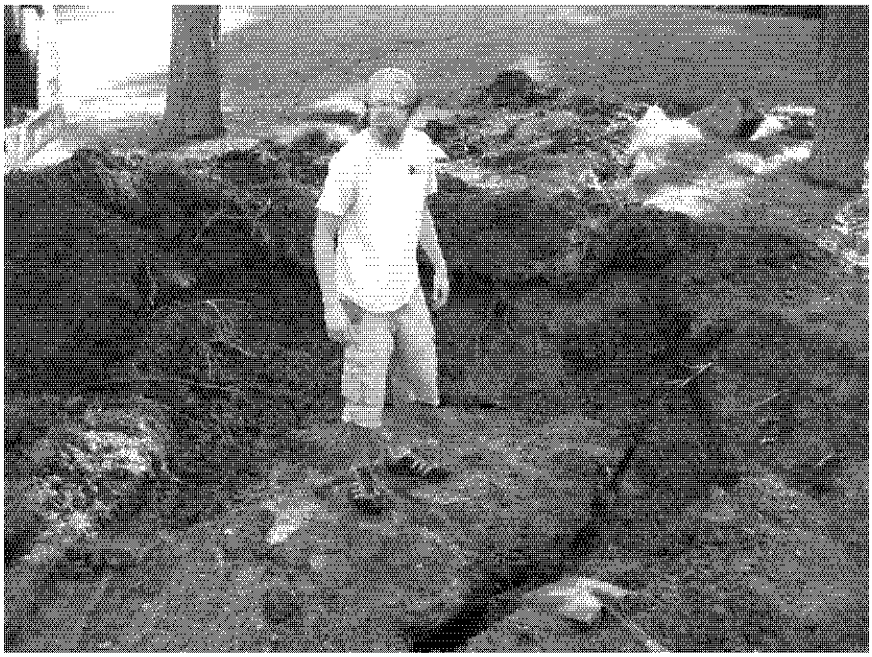

**Figure 12**: HALS Team Member standing on capstone of the aqueduct in the Kitchen Garden. This aqueduct was excavated for maintenance following the severe flood event of July 31, 2009. (Photograph by Alan Grosse).

**Figure 13**: View of the same aqueduct as above after the capstone was lifted for maintenance following the severe flood event of July 31, 2009. (Photograph by David Driapsa).

**Figure 14:** Existing conditions view from the Second Dwelling looking north across the west dooryard of the Second Wash House. (Photograph by Andy Meessmann).

**Figure 15:** Historic view from same location as above from the Second Dwelling looking north across the dooryard of the Second Wash House. This is a meeting of the Salvation Army and the North Family Shakers. The historic image was made in 1903 when the Salvation Army visited the North Family Shakers. (Photograph courtesy of the Shaker Museum & Library).

**Figure 16:** Existing conditions view from the Brethren's Workshop looking east toward the Second Dwelling. (Photograph by Meessmann).

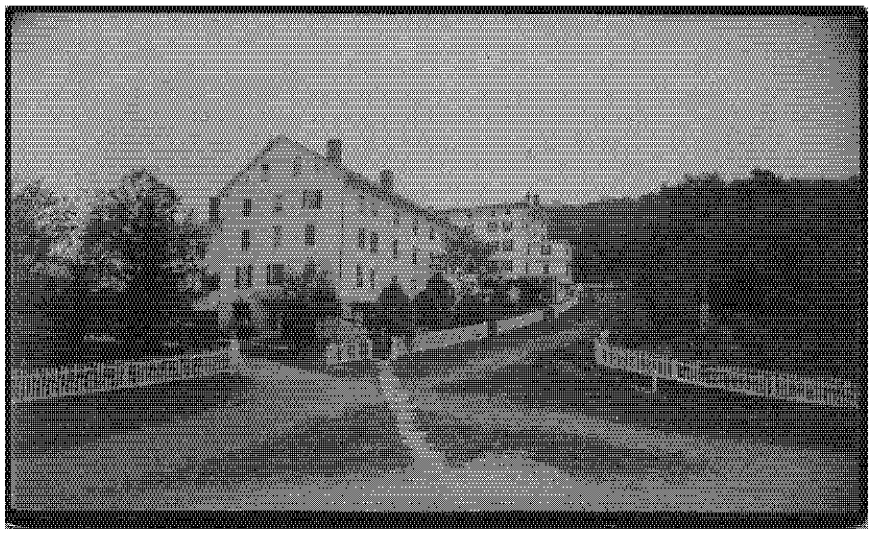

**Figure 17:** Historic view from same location as above from the Brethren's Workshop looking east toward the Second Dwelling. The undated historic image was made when the Shakers still occupied the North Family. (Photograph courtesy of the Shaker Museum & Library).

**Figure 18:** Existing conditions view from Shaker Road (formerly named the Albany to Pittsfield Post Road) looking south toward the Brethren's Workshop above and the Sawmill and Gristmill ruin to the right. (Photograph by Andy Meessmann).

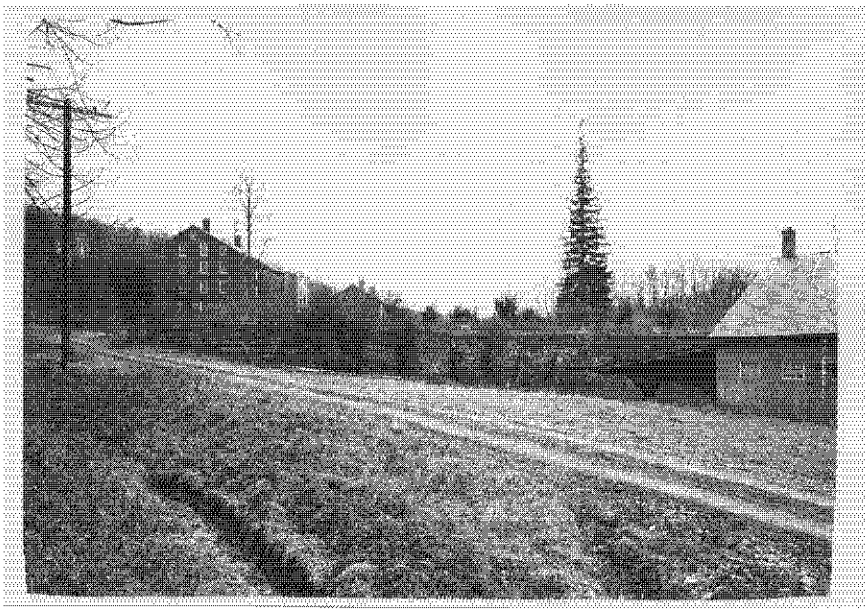

**Figure 19:** Historic view from near the same location as above from Shaker Road (formerly named the Albany to Pittsfield Post Road) looking south toward the Brethren's Workshop above and the Sawmill and Gristmill to the right. (Photograph courtesy of the Shaker Museum & Library).

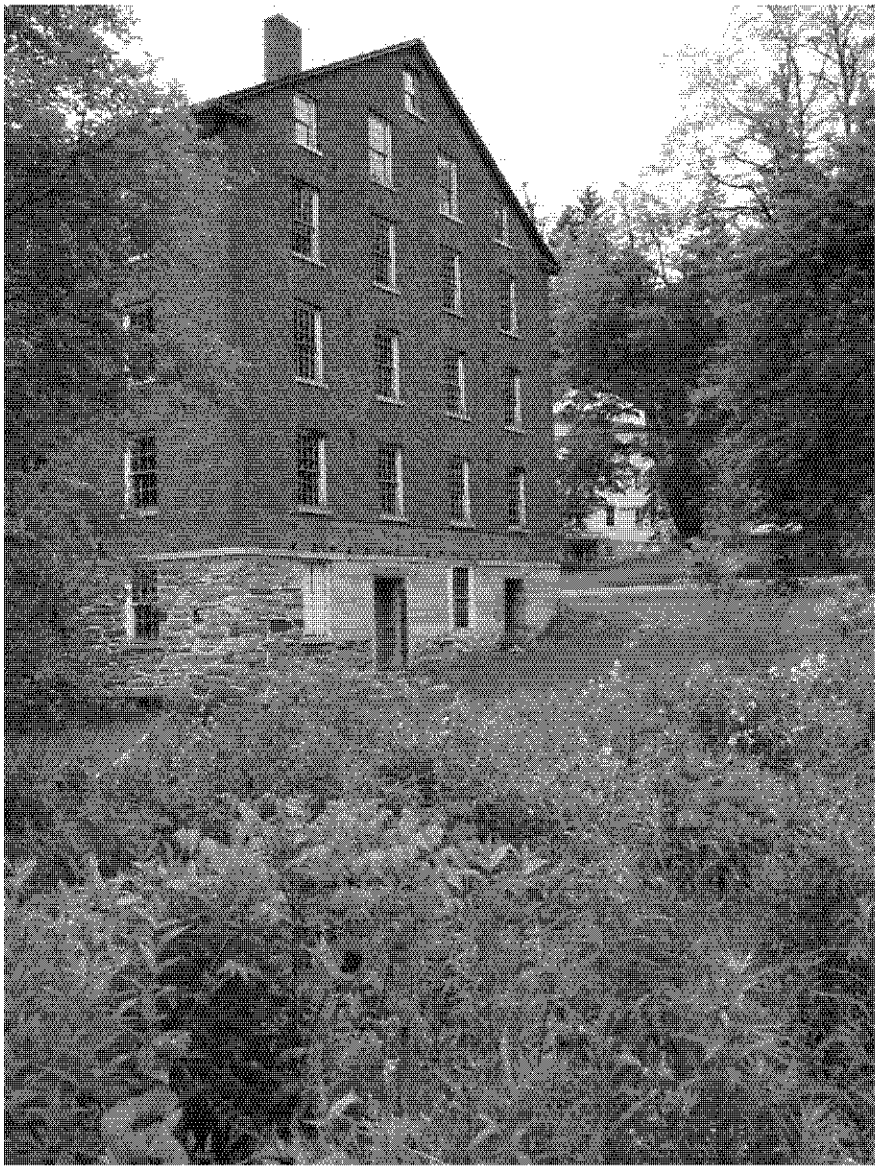

**Figure 20**: View of the existing landscape looking northeast toward the Brethrens Workshop with poppies in foreground. (Photograph by David Driapsa).

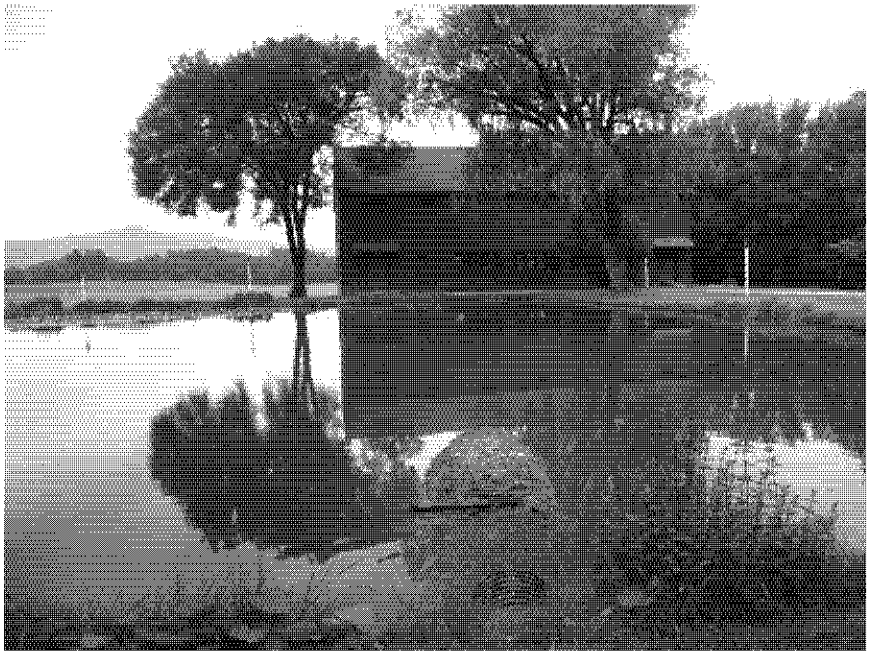

**Figure 21**: Millpond in the Church Family. This is an existing millpond in the Mount Lebanon Shaker Village. (Photograph by David Driapsa).

**Figure 22**: Reservoir above the North Family. This undated historic photograph is a record of the open landscape of meadows and pastures. (Photograph courtesy of the Shaker Village & Library).

**Figure 23**: Digital model of the North Family, Mount Lebanon Shaker Village. (Photograph by Allan Grosse).

**Figure 24**: This undated historic photograph records landscape when the Shakers occupied the Mount Lebanon Shaker Village, with the mosaic of clustered buildings surrounded by gardens, fields, pasture, mountain meadows and woodlots, interspersed with millstreams and millponds. (Photograph courtesy of the Shaker Museum & Library).

Appendix One: Shaker Journals - Waterworks

The journal entries included in this appendix pertain to the waterworks systems in the North Family as recorded by the journals of Shaker Elders, Trustees and Garden Deacons in 500 pages transcriptions by Jerry Grant. The sources include the North Family Elders Journal in collection of the Shaker Library, Sabbathday Lake, Maine [MeNGSLib, manuscript number 10-DJ-010]; North Family Book of Records in the collection of New York Public Library, New York, New York [NN, manuscript number 20]; Sr. Jane Knight's Journal (1833-1839) in the collection of the Shaker Museum and Library, Old Chatham and New Lebanon, New York [NOC, manuscript number 10362]; and Private Journal, 1861-1892 kept by Frederick Evans in the collection of the Henry DuPont Winterthur Museum Library, Winterthur, Delaware. This is an ongoing transcription of abstracts from this journal and not complete as of June 20, 2009.

The Shaker Journals from the Church, Center, and East Families were not consulted to scope of work and limits of time, but these would be valuable sources of data on the waterworks system and particularly into the cooperative relationship between the families with respect to water use and water rights.

The following Journal articles were drawn from about 500 pages of transcriptions. These entries were very helpful in helping the HALS team understand the development of waterworks systems in the North Family.

1833 jun: *Put up an addition to the Saw Mill for the purpose of sawing stone.* [NN, Shaker Collection, Ms. No. 20]

1838 oct 7: *Repaired the Saw Mill with a new Wheel, Aqueduct, Roof &c.* [NN, Shaker Collection, Ms. No. 20]

1839 nov 10: *Laid lead Aqueduct from a well in the White Lot to the Horse Barn distance forty rods.* [NN, Shaker Collection, Ms. No. 20]

1844 oct: *Built a barn and shed also moved a small barn on the Campbell place. Adjoining this barn about 8 rods was dug a well and the water brought in lead pipe to the barn to accommodate the sheep. Also another well dug near the house barn and supplied with a pump.* [NN, Shaker Collection, Ms. No. 20]

1844 nov: *Dug well and laid lead pipe for a watering place on land bought of G. Spencer & brother* [See March 18, 1842] [NN, Shaker Collection, Ms. No. 20]

1845 jul 22: *Brought in to the Aqueduct an additional Spring of Water and the wells at the fountain of the other Springs* [NN, Shaker Collection, Ms. No. 20]

1845 jul: *Laid Aqueduct to the Barns at the Royce Place about 35 Rods. Dug a well & layed lead pie for a watering place in the Northeast Corner of the Square Meadow east of the House.* [NN, Shaker Collection, mss. No. 20]

1845 nov*: Dug a well and laid lead pipe for a watering place on the land bought of G Spencer & Brother.* [NN, Shaker Collection, mss no 20]

1845 dec: *Underdrained the past season the east part of the Darrow meadow & considerable on the Perry farm on the flat North of the House.* [NN, Shaker Collection, mss. No. 20]

1846 dec: *Repaired the Saw Mill with iron ways & rollers. For the Carriage & new saw gate with Irons for to hold it*-- [NN, Shaker Collection, mss. No. 20]

1846 dec: *Laid lead aqueduct pipe from the well at the south west corner of the west house to the sheep barn Also from the branch leading from the Cistern to the Barn branch to the North Shop.* [NN, Shaker Collection, mss. No. 20]

1846 dec: *Laid new Aqueduct from the pond to the brick Shop the logs previously laid not being of sufficient bore to admit water enough – at the same time repaired the waterwheel with new cast iron segments & trunnel wheel(?)* [NN, Shaker Collection, mss. No. 20]

1848 jun 30: *Make a drain from Dairy to road* [MeNGSLib, mss. No. 10-DJ-010

1848 jul 1: *Build stone wall, north of the north garden and underlain the land paid for doing the same, (cash) bout 500 dollars – board and other items 500* [NN, Shaker Collection, mss. No. 20]

1849 aug 25: *Lay'd [laid] this season near 3000 earthen tile for draining—some back of old hog pen;--some of the three corner lot, and some in the low land adjoining what is called Samuel's Garden. Other again were laid on land got of Asehel Royce; some in the east meadow and some in the pasture back of McNaught house* [NN, Shaker Collection, mss. No. 20]

1850 jun 11: *Put a large stone drain tho Milking Yard taking water from the upper road.* [MeNGSLib, mss. No. 10-DJ-010]

1850 dec 17: *Did many rods of underdraining on the low lands north of the north garden….* [NN, Shaker Collection, mss. No. 20]

1851 oct 17: *Finish the drain above the hen yard* [MeNGSLib, mss. No. 10-DJ-010]

1851 dec 18: *Some stone wall has been built this season on our premises and some under draining in different places with stone and tiles* [NN, Shaker Collection, mss. No. 20]

1853 nov 26: *Bought of Murdock 45 acres of land above [Lebanon ]Springs.* [NN, Shaker Collection, mss. No 20]

1855 jul: *Built a new Saw Mill Dam at cost of $1500. It is an arch thrown up against the stream being what is called an <equilateral> arch, because the pressure in <equal> on all parts.* [NN, Shaker Collection, mss. No 20]

1857: *Repaired this season our sawmill by placing under it a new foundation and adding to the width. Also put an additional waterwheel for driving the thrashing machine, circular saw planing machine &c.* [NN, Shaker Collection, mss. No 20]

1857 dec 1: *Laid Aqueduct to convey water to the barn on the Perry plac[e] from a spring on land owned by Benjamin Peabody of wherein the right & priviledg[e] w[a]s purchased & recorded.* [NN, Shaker Collection, mss. No 20]

1858 jul: *Commenced dig[g]ing artes[i]an well in side Hill orchard.* [NN, Shaker Collection, mss. No 20]

1858 aug 27: *North House commence the boring of a new well.* [MeNGSLib, mss. No. 10-DJ-010]

1858 dec 29: *Put up Bath works and put in traps to all places leading from drains* [illegible]. [MeNGSLib, mss. No. 10-DJ-010]

1859 jan (supplement: *The North Family [NFNL] have progressed with the artesian well, and in the month of December got down to solid rock about 50 ft deep. So much water they cannot bore, and they run in [horizontally] from the bank [slope to the west, an underground drane [drain] called a drift, from the bank out side to the well at the rock, this <draned> off the water, they then commenced boring and went down many feet, at length dropped a cold chisel into the hole, which cost them several days labor. But about the 1st of this month they had drilled down about 140 ft.-- Last week they had bored about 158 feet & met with a stratum of clay about 1 foot thick since which the hole has filled up about 8 ft. they <succeded> in removing this and got about 27 gallons of water per minute* [NOC, mss. No. 10342]

1859 feb 15: *The North Family are boring an artesian well in the hill side east of their dwelling house, they have a four inch hole about 120 feet in the rock, which is 56 feet below the surface, and are still boring. They are getting timber also for a large barn, most probably of stone, 190 feet long 3 stories high at the west end, running into the bank at the east end. – to be built this year and next. – The Second family are also about to build a new barn.* [Letter from Giles B. Avery, Center Family, New Lebanon, NY, to

Otis B. Sawyer, New Gloucester, ME, 15 February 1959, OCWHi, Shaker Collection, mss. No. IV:A-42]

1859 feb: *The Artesian well is down about 400 feet it has cost some 4000. This is considered a failure.* [NN, Shaker Collection, mss. No. 20]

1859 apr 13: *Artesian well produces now 15 Gal per minute.* [MeNGSLib, mss. No. 10-DJ-010]

1859 jul 11: *The North Family commenced boring for water again having proceeded 350 feet and not getting supply of water, they contract for 100 ft. more.* [NOC, mss. No. 10342]

1860 jan 20: *On the Stanton Meadow, we put an open ditch across the top (6 ft. Wide 3 deep) and another from the top to the road. Also under dreans [drains] in different directions; in all 209(?) rods…, and we plough the lot and use up the stone on the drains.* [NN, Shaker Collection, mss. No. 20]

1860 mar [1]: *Run Saw Mill day & night.* [MeNGSLib, mss. No. 10-DJ-010]

1860 oct 14: *Laid down about 1000 ft of Lead pipe to carry water from the Drift(?) Any other places to new barn, Horse barn yard &c cost of pipe and labor bout $300.*

1861 jan 20: *All the drains built this year amount to 509 rods. Relay the stone barn floors and otherwise finish it off.* [NN, Shaker Collection, mss. No 20]

1861 jan 20: *Put eave troughs to stone barn, ox shed, soap house, connect eaves of garden house with drain, and put eave troughs to middle shed, and connect them with dreans [drains] 7c.* [NN, Shaker Collection, mss. No 20]

1861 jan 20: *Make a drain in King lot. One in Proctor lot. One in Thompson lot. Two on Perry place. And series of drains on the Upper Perry Meadow. One in the Dupy [Dupee?] lot. One in the Ox Pasture. One in the East Garden.* [MeNGSLib, mss. No. 10-DJ-010]

1862 feb 12: *Do some ditching on M. Perry Meadow, the Rice place, and on Stanton Mountain.* [NN, Shaker Collection, mss. No. 20]

1862 may 14: *Take down the Well House.* [MeNGSLib, mss. No. 10-DJ-010]

1863 apr 28: *Dig cellar under the upper house…. Put in steam boiler and pipes…. Carry the steam to the Sisters Shop.* [NN, Shaker Collection, mss. No 20]

1863 sep 8: *Take out the old Water Wheel in Brick Shop and put in a new wheel work over all the machinery.* [NN, Shaker Collection, mss. No. 20]

1863 sep 8: *Sell Hogobuan(?) Lot above springs.* [NN, Shaker Collection, mss. No. 20]

1863 sep 8: *Build about 700 rods of ditches or underdrains and about [ ] of stone walls.* [NN, Shaker Collection, mss. No 20]

1863 sep 14: *Putting in new Water Wheel.* [MeNGSLib, mss. No. 10-DJ-010]

1864 nov 14 *Building a Cistern and diging(?) Pipe to Wash House hold 100 hd.* [MeNGSLib, mss. No. 10-DJ-010]

1864 nov 30: *Buy new wash Mill of David Parker for 150.00.* [MeNGSLib, mss. No. 10-DJ-010]

1864 dec 14: *Teams draw dirt to Cistern.* [MeNGSLib, mss. No. 10-DJ-010]

1864 dec 14: *Move the old Lumber Shed at the Saw Mill.* [MeNGSLib, mss. No. 10-DJ-010]

1865 jul: *Build a Cistern to hold some 100 h'd [hogsheads?] in Garden to take the wash house and S[econd] house and from first house. Also about 1000 feet of tile.* [NN, Shaker Collection, mss. No. 20]

1865 sep 26: *Working over the Machinery at the Saw Mill take out one wheel and work it all over making it much simple.* [MeNGSLib, mss. No. 10-DJ-010]

1865 nov: *Draw some 200 load of dirt from the front of Saw Mill to Cistern. Build stone wall to Mill – North side. Move the old lumber barn at saw mill the grain barn and repack the lumber.* [NN, Shaker Collection, mss. No 20]

1866 jan: *Take the old Blacksmith shop for Ice house fill from Lower Pond. Put in 95 loads of Ice in 1866.* [NN, Shaker Collection, mss. No. 20]

1866 jan 28*: Drain laid to Cistern across Garden to take the wash of the Barn Yards. Drains laid in the dooryard to take wash from First & Second house and from Sister's Shop to Cistern.* [NN, Shaker Collection, mss. No. 20]

1866 jan 28: *United with Chh & Tilden in draining swamps.* [NN, Shaker Collection, mss. No. 20]

1866 jan 28: *Let Gillett by Instrument have right of water from Rice Meadow.* [NN, Shaker Collection, mss. No. 20]

1866 mar: *Finish clearing & draining the McNaught pasture Lot on Rice farm and plough it up.* [NN, Shaker Collection, mss. No 20]

1866 mar: *Put apparatus for cooling water into the ice house to be drawn in the kitchen.* [NN, Shaker Collection, mss. No. 20]

1866 mar: *Finish clearing & draining the McNaught pasture lot on Rice farm and plough it up.* [NN, Shaker Collection, mss. No. 20]

1866 may 24: *Rogers brings back water wheel.* [MeNGSLib, mss. No. 10-DJ-010]

1866 aug: *Sel Gillet a water priveledge [sic] in Rice Meadow.* [NN, Shaker Collection, mss. No. 20]

1866 aug 29: *Sell Gillett a water priveledge [sic] in Rice Meadow.* [NN, Shaker Collection, mss. No. 20]

1866 sep 27: *Digging drains in Door Yard.* [MeNGSLib, mss. No. 10-DJ-010]

1866 sep: *Dig drain down to Cistern so as to take the wash from the Barn Yards.* [NN, Shaker Collection, mss. No. 20]

1866 sep: *Put drains in door yard leading to Cistern.* [NN, Shaker Collection, mss. No. 20]

1866 sep: *Dig drain down to Cistern so as to take wash from the Barn Yards.* [NN, Shaker Collection, mss. No. 20]

1866 sep: *Put drains in door yard leading to Cistern.* [NN, Shaker Collection, mss. No. 20]

1867 nov: *Set new [water?] tub in Milking yard.* [NN, Shaker Collection, mss. No. 20]

1870 aug 31: *Clean out upper pond.* [NN, Shaker Collection, mss. No. 20]

1871 may 26: *Put in new watering tub by deacon's shop and one in east cow yard.* [NN, Shaker Collection, mss. No. 20]

1871 sep 18: *Clean out lower pond: deepening it, repairing its banks and the roads.* [NN, Shaker Collection, mss. No. 20]

1872 feb 5: *Great scarcity of water. It has to be drawn quite a distance.* [NN, Shaker Collection, mss. No. 20]

1872 jul 6*: Lay tiles in the Drift, half way up; then cover with timber. Close it up, and run drift water down to the Ox tub. Send overflow of the cistern to the Stone Barn.*

*Leave connection intact, so that it can be turned to the Horse Barn.* [NN, Shaker Collection, mss. No. 20]

1872 jul 26: *Lay tile in the drift halfway up and the cover with timber. Run the drift water down to the Ox <tub>. Send overflow of the cistern to the Stone barn.* [MeNGS, mss. No. 10-D-010]

1872 dec 13: *Conclude to open the outlet to the Canaan swamp.* [NN, Shaker Collection, mss. No. 20]

1873 aug 12: *Construct water works at east farm…. Laid 2500 ft. of wooden pipe up the hill, to conduct water to the barn.* [NN, Shaker Collection, mss. No. 20]

1873 oct 24: *Covered steam pipes in cellar.* [NN, Shaker Collection, mss. No. 20]

1874 jun 2: *Lay Aqueduct pipes in West Orchard.* [NN, Shaker Collection, mss. No. 20]

1874 sep 8*: Pay for ditching north orchard.* [NN, Shaker Collection, mss. No. 20]

1875 jan: *General failure of water all round [from freezing]. All families have to draw water. Great snow storm.* [NN, Shaker Collection, mss. No. 20]

1875 apr 1: *Evergreens round Pond all [illegible] Some branches(?) Put in deep,* (illegible). [NN, Shaker Collection, mss. No. 20]

1875 jun 3: *Lay ditch tile in N orchard. Build a large drain on the North side.* [NN, Shaker Collection, mss. No. 20]

1875 jul: *Draw wooden pipe of feet 5000 to bring water from East family creek to a pond 200 by 50 built on a lot above the grove, 100 ft full. The cost of pond and branches 230.00. We lay iron pipe from pond to the houses 6 in. 4 in. and 3 in. from the 4 hydrants total cost 2000.00.* [NN, Shaker Collection, mss. No. 20]

1875 sep 20: *Fix water works at rice Place and on E Family farm.* [NN, Shaker Collection, mss. No. 20]

1875 sep [i.e., oct 27]: *Hydrants throw water above all buildings.* [NN, Shaker Collection, mss. No. 20]

1876: *Copy of Receipt. This is to certify that I have this day duly delivered over to Fredrick W. Evans the sum of two thousand and five hundred dollars to be used and expended by him in building and conducting the Water Works now in process of construction in the Shaker Village in New Lebanon, County of Columbia, and State of New York, the same being a free gift of contribution by me, towards the construction of such Water Works for the use and benefit of the North family of Shakers. Also the sum of*

*two thousand three hundred and seventy six dollars ($2376.00) to be used and expended by said Frederick W. Evans for the uses, purposes and benefit of said North Family as he may deem most for the interest of said family – New York February 26, 1876. Emil Bretzer. Witness Elderess A. Doolittle. I have also dedicated – consecrated – through Fredrick W. Evans, (Elder) for the uses and benefit of the above named North Family of Shakers, and agreeable to its Covenant which I have signed….* [NN, Shaker Collection, mss. No. 20].

1876 jan 10: *Put pipe in Upper House to carry water through chimneys to the bath rooms, one for the brethren and one for the sisters…. Put large tank up Garret Gal 190 (490?).* [NN, Shaker Collection, mss. No. 20]

1876 apr 15: *Make drain (Iron pipe) from House to garden drain to orchard.* [NN, Shaker Collection, mss. No. 20]

1876 oct 10: *14 persons work on pond.* [NN, Shaker Collection, mss. No. 20]

1876 nov: *The new washing machine has cost about 60.00. It succeeds.* [NN, Shaker Collection, mss. No. 20]

*1877 jan 15: Build a new wash mill. It works well, dispenses with the steaming of clothes.* [NN, Shaker Collection, mss. No. 20]

1877 mar: *Put a large tank up garret.* [NN, Shaker Collection, mss. No. 20]

1877 aug 16: *We lay 1000 ft. Iron pipe on the line from East family.* [NN, Shaker Collection, mss. No. 20]

1877 dec 8: *Move Cistern in first garden. Build covered drain in north orchard. Lay iron pipe — 4 in – from the Wash house to Little Orchard. It took 600 ft. pipe and 50 ft. wooden pipe.* [NN, Shaker Collection, mss. No. 20]

1878 jan: *Fix creamer in north Kitchen the over flow of pond cool enough.* [NN, Shaker Collection, mss. No. 20]

1878 feb 18*: Cut tops of Willows by stone barn road.* [NN, Shaker Collection, mss. No. 20]

1878 mar 30: *Build creamery S[econd] House Dairy with brick laid in cement. Use drift overflow water.* [NN, Shaker Collection, mss. No. 20]

1878 may 28: *Set Willows round U[pper] pond above B*rethren's. Shop. [NN, Shaker Collection, mss. No. 20]

1878 oct 15*: Lower the drainage of the S[econd] House and put Iron piping in.* [NN, Shaker Collection, mss. No. 20]

1878 oct 17*: Lay 137 Roads [i.e., Rods] Pipe from Spring to Cistern for kitchen use T. Haphy Contractor Lee Mss Cost (with some ditching) $424.80. Ensured for 5 years by Bond. [The County Atlas of Berkshire Massachusetts... by F.W. Beers... 1876, lists Thomas Heaphy stone Mason in Lee, MA, p. 113]* [NN, Shaker Collection, mss. No. 20]

1878 oct 25*: Lay 100 ft. cement pipe 6 inch from new Wash House to Drain.* [NN, Shaker Collection, mss. No. 20]

1878 oct 25: *Use 3600 brick in W[ash] house and cistern.* [NN, Shaker Collection, mss. No. 20]

1878 oct 31: *Build out of Kitchen Ice House, a cistern, 13 x 13, 11 ft. deep to take rain water from three buildings. It will hold [blank].* [NN, Shaker Collection, mss. No. 20]

1878 nov: *Put Iron Boiler into chimney at W. House 7 x 4 ft. holds 580 gallons this boiler connected with cistern 13 x 13 10 ft. deep holding 10985 gal (or 174 Hogsheads).* [NN, Shaker Collection, mss. No. 20]

1879 feb: *The NORTH has been making reservoirs for catching and preserving soft water, lying large pipes there from to their new wash-house and laundry... [Society Record, "The Shaker Manifesto 9* (February 1879): 47]

1879 oct 4*: Dig ditch in N[orth]. O[rchard]. Lying stone Drain.* [NN, Shaker Collection, mss. No. 20]

1879 oct 4: *Take water from Horse Barn to Hen House.* [NN, Shaker Collection, mss. No. 20]

1880 may 1: *Fix cement Pipe from Spring, &c. $100.* [NN, Shaker Collection, mss. No. 20]

1880 jan 21: *We take the Windsor Mill (Steam) for $17000* [Windsor, NY]. [NN, Shaker Collection, mss. No. 20]

1880 mar 13: *Fix Windsor Mill to burn sawdust.* [NN, Shaker Collection, mss. No. 20]

1880 may 1: *Fix Cement Pipe from Spring, &c.* [NN, Shaker Collection, mss. No. 20]

1880 jun 21: *Put in new wheel into Saw Mill.* [NN, Shaker Collection, mss. No. 20]

1880 jul 27: *Pay Robbins for Iron Pipe $54.74.* [NN, Shaker Collection, mss. No. 20]

1880 aug 8: *Pay Heaphty for Cement Pipe from East Family, and other jobs. $904.07. [NB: Note added JUNE 23(23) 1888: The cement Pipe a total failure.* [NN, Shaker Collection, mss. No. 20]

1880 dec 15: *Law [i.e., lay] pipe from Wash House boiler to Barn to give Cows warm water. It works well.* [NN, Shaker Collection, mss. No. 20]

1881: *Work at the Water Works. Dig a new well to supply the kitchen. Build cement pipe from East Farm to Pond. We gather floor end of Iron Pipe. Put down large stone drain from the stone wall north roads. Also in orchard north.*

1881 jan 9: *Conclude to build Iron Aqueduct from Brick Shop, to Pond – 2 lengths 16 inches – remainder 12 The Waterwheel cost $250 Whole Cost $1200.* [NN, Shaker Collection, mss. No. 20]

1881 feb: *Lay water pipe from Spring to kitchen Cistern $132.42.* [NN, Shaker Collection, mss. No. 20]

1881 mar 8: *Bill of Iron Pipe, Freight included, some $2000.* [NN, Shaker Collection, mss. No. 20]

1881 apr: *Right up the Saw Mill sheds.* [NN, Shaker Collection, mss. No. 20]

1881 may 12: *Take up floors story, 2nd House Dig drains, put in Iron pipe, cement over all and lay the floors.* [NN, Shaker Collection, mss. No. 20]

1881 may 12: *Church bore into Mountain for Water – Cost $8000.* [NN, Shaker Collection, mss. No. 20]

1881 may 12: *Receive of Br, Charles, for Pipe for $546. 95.* [NN, Shaker Collection, mss. No. 20]

1881 may 13: *Bring a Waterwheel from PA – Not used.* [NN, Shaker Collection, mss. No. 20]

1881 jul 26: *Begin work on Cement Pipe from pond to East Farm cost $600.* [NN, Shaker Collection, mss. No. 20]

1881 oct 26: *Work at Ice pond Dam.* [NN, Shaker Collection, mss. No. 20]

1881 dec 28: *Connect Pipes of House Bath with Wash House – In fixing House Boiling, we [illegible] chimney Pipes – Want of forethought.* [NN, Shaker Collection, mss. No. 20]

1882 jan 6: *Substitute Iron for Lead traps, in 2nd house.* [NN, Shaker Collection, mss. No. 20]

1882 mar 14: *Begin to take down south chimney. Terra cotta pipe $59.40. Iron pipe for Water from East Farm $309.32.* [NN, Shaker Collection, mss. No. 20]

1882 may 5: *Grade front of Upper House, 19 inches fall to North and 2 feet to South.* [NN, Shaker Collection, mss. No. 20]

1882 may 31: *Put in Refrigerator, 500 Iron Pipe.* [NN, Shaker Collection, mss. No. 20]

1882 aug 5: *Fix Cow Yards.* [NN, Shaker Collection, mss. No. 20]

1882 sep: *Put Drains in Cow Yard.* [NN, Shaker Collection, mss. No. 20]

1882 sep: *Grade round the Paint Shop.* [NN, Shaker Collection, mss. No. 20]

1882 nov : *Work at Pond, all hands.* [NN, Shaker Collection, mss. No. 20]

1883 *The pipe down the mountain from Spring to Cistern has been renewed three times.*
*1st Galvanized Iron*
*2nd Wood*
*3rd Cement*
*Now Wrought Iron*

*In Pitt[sfield], Lenox, Lee Dalton Robbins says that Gal Iron was laid about the time that we used it and that it has done and is doing well–gives good satisfaction. He claims that we had a bad lot. That it was poorly galvanized.*

*The Cement does the same. All of this shows practical ignorance on my part. I began ignorant of almost any branch of knowledge. Was anxious to do eight modestly, listened to others views and opinions, adopted what appeared to be best, and what proved few otherwise.*

*In trying to save expense on the waters from East Family I put down Wooden Pipe 4 inch at top when 2 inch it proved too small. We put down cement 4 inch. It was a failure – a stupid failure. Dealt with wrong histories, people of no discipline shewing on my part credulous incapacity and overwelling self conceit. Also lack of discernment. A man is known by the company he keeps. I got into bad company. Experience is the schoolmaster of the simple. When shall I become wise and no more mistakes? Have done pretty well the last years. Done a great deal spent between $13 & 14000 and have little to regret. Hope to make no mistakes the coming season of 1883.* [DeWint]

1883 feb: *Lay water pipe from spring to kitchen cistern $132.42.* [NN, Shaker Collection, mss. No. 20]

1883 may: *Buy 2nd hand iron pipe some 1000 ft. Lay the remainder 700 ft. of E. Family pipe clear to the pond.* [NN, Shaker Collection, mss. No. 20]

1883 aug 22: *Begin to put water to Sister's Shop to start Shirt Factory.* [NN, Shaker Collection, mss. No. 20]

1883 oct 5[?]: *Repair Lower Pond Dam with dirt out of the Pond.* [NN, Shaker Collection, mss. No. 20]

1883 nov 1: *Set out watering tubs – Horse Pasture, Swamp Barn, Middle Cow Yard.* [NN, Shaker Collection, mss. No. 20]

1883 nov 1: *Begin to work at Mountain Pond Dam enlarge it nearly one half.* [NN, Shaker Collection, mss. No. 20]

1883 nov 21: *Rip Rap banks to U[pper] M[ill] Pond.* [NN, Shaker Collection, mss. No. 20]

1884 mar: *Boiler & Engine cost bought in Pittsfield. 225.00.* [NN, Shaker Collection, mss. No. 20]

1884 sep 26: *Take out the Water Wi[t]ch 43 ft long from E[ast] Family pipe.* [NN, Shaker Collection, mss. No. 20]

1884 oct 27: *Begin to work at Dam.* [NN, Shaker Collection, mss. No. 20]

1884 oct 30 *Drane [Drain] stuff in N[orth] Ochard.* [NN, Shaker Collection, mss. No. 20]

1884 nov 19: *Build wall in the east side of the Pone[Pond?]. It is some 200 feet long and 4 ft high.* [NN, Shaker Collection, mss. No. 20]

1885 sep 3: *Renew the pipes connecting the Sister's Shop and the House.* [NN, Shaker Collection, mss. No. 20]

1885 nov 12: *Build drain across the road by Ice House and Cow E[ast] Yard.* [NN, Shaker Collection, mss. No. 20]

1886 mar 4: *Shaft to Wash Mill broken, Put in shaft from PA. Water Wheel.* [NB: See May 13, 1881] [NN, Shaker Collection, mss. No. 20]

1886 may: Plow Pond Lot, for potatoes. [NN, Shaker Collection, mss. No. 20]

1886 jul: *At L House we bought a Water Wheel for $158.00 yet it exchanged for one worth $200.00 Loose the use of it all the season. Put in Steam Pipe & into O should have been larger at top. Going to take Iron Pipe up and down Wooden Aqueduct. Hope one will pay for the other.* [Elder Frederick Evans Private Notebook 1861-1892, p. 32]

1886 jul: *The pipe should have been Wooden Aqueduct 18 Inch at top as all the way.* [Elder Frederick Evans Private Notebook 1861-1892, p. 32]

1886 nov 5: *Working on dam on the hill. Trim willows and use them on the banking.* [NN, Shaker Collection, mss. No. 20]

1886 nov 19: *Had a great rain and flood – damage done.* [NN, Shaker Collection, mss. No. 20]

1886 nov 22: *Fill in the artesian well.* [NN, Shaker Collection, mss. No. 20]

1886 nov 19: *Fix for warming water in Yard tubs. It works well and will pay.* [NN, Shaker Collection, mss. No. 20]

1887 apr 10: *James Ashley makes pattern for wash-mill, Canaan. Wm. Shumway builds it.* [NN, Shaker Collection, mss. No. 20]

1888 jan 2: *Put in small wheels in the water-wheel, Brick shop.* [NN, Shaker Collection, mss. No. 20]

1888 nov 1: *Br D[aniel Offord] draws off the pond, to stop leak & clean strainer.* [NN, Shaker Collection, mss. No. 20]

1889 jun 7: *Re-lay the wall on road to Springs cost 400.00.* [NN, Shaker Collection, mss. No. 20]

1889 nov 2: *Empty the mountain pond, & clean it out & build a cranberry pond. Put in large iron pipe 14 pieces.* [NN, Shaker Collection, mss. No. 20]

1890 jan 8: *Setting over boiler in wash house.* [NN, Shaker Collection, mss. No. 20]

1891 dec 9: *Begin cutting willows in nursery round pond.* [NN, Shaker Collection, mss. No. 20]

1892 jan 6: *Have paid John Welsh $70.00 for ditching done in meadow on the flats.* [NN, Shaker Collection, mss. No. 20]

1892 jan 28: *The pipe that conveys the water from the East Farm to the reservoir is frozen ad there is no water running in.* [NN, Shaker Collection, mss. No. 20]

1892 jan 30: *Get the water pipe thawed and the water running to the ox pasture.* [NN, Shaker Collection, mss. No. 20]

1892 feb 1: *Have the water running into the reservoir.* [NN, Shaker Collection, mss. No. 20]

1892 dec 27: *Water pipe frozen that conveys the water from the East Farm frozen it creates quite an alarm.* [NN, Shaker Collection, mss. No. 20]

1892 dec 30: *We succeed in thawing out the water pipe, but it is of no avail.* [NN, Shaker Collection, mss. No. 20]

1892 dec 31: *The year closes on the Zero mark and our supply of water to the reservoir is cut off by frost.* [NN, Shaker Collection, mss. No. 20]

1893 jan 26: *Order iron pipe 6 and 4 in. of Chas Miller Utica N.Y. to lay new line. Cost here is $416.98.* [NN, Shaker Collection, mss. No. 20]

1893 mar 5: *El[der] Frederick [Evans] passes peacefully away to the Spirit world at 10 O'clock A.M. without a struggle.* [NN, Shaker Collection, mss. No. 20]

1893 mar 13: *Surface water enough runs in the reservoir so we use the machinery.* [NN, Shaker Collection, mss. No. 20]

1893 apr 4: *Engage John Nash to dig ditch for new line of pipe for $1.00 per rod.* [NN, Shaker Collection, mss. No. 20]

1893 may 11: *Commence laying the new pipe. Cows out 1st time.* [NN, Shaker Collection, mss. No. 20]

1893 may 20: *Pipe all layed and connected.* [NN, Shaker Collection, mss. No. 20]

1893 jun 2: *Get the water running thro the new pipe.* [NN, Shaker Collection, mss. No. 20]

1893 jun 17: *Setting iron tub in the east yard have made it all one and are laying iron pipe so as to thoroughly drain the yard.* [NN, Shaker Collection, mss. No. 20]

1893 aug 20: *Bring water from Spring in cow yard to shoe tub in the dooryard.* [NN, Shaker Collection, mss. No. 20]

1893 sep 27: *Put new posts under the granary and cement the cellar put in a drain so the water will run off.* [NN, Shaker Collection, mss. No. 20]

1894 jan 5: *Putting in Buckleys water arrangement in the Stone barn.* [NN, Shaker Collection, mss. No. 20]

1894 jan 11: *We find we have put the basins in the wrong place; the cattle cannot reach the water; shall have to alter them.* [NN, Shaker Collection, mss. No. 20]

1894 jun 14: *Draining the cow barn vault: put a 4 in pipe under the foundation of the barn at the west end.* [NN, Shaker Collection, mss. No. 20]

1894 jun 15: *Dig ditch from south end of the cow barn vault to drain running thro the north orchard; and lay in 4 inch iron pipe and 4 in drain tile it has been a very difficult job.* [NN, Shaker Collection, mss. No. 20]

1894 aug 3*: Getting willow trees out of the upper pond they were cut and fell into the water last spring, and was a very great mistake.* [NN, Shaker Collection, mss. No. 20]

1894 dec 7: *Setting up water motor at Canaan to drive sewing machines.* [NN, Shaker Collection, mss. No. 20]

Appendix Two: Of Canals for Conveying Water to Mills

The *Young Mill-Wright and Miller's Guide* written by Oliver Evans and published in Philadelphia in 1795 was the "standard reference" in North America at the time when the Shakers were beginning to develop waterworks in New Lebanon. The HALS team accessed the book from the Shaker Museum and Library but there is no record that this copy was from the North Family. It is believable that the Shaker millwrights would have referred to this source as a reference. As the book is very old and rare, three sections are included below in this appendix. The first part is on canals for conveying water. The next is on Evans' observations on improving mill seats. And the final section is on the building of mill dams. This was a valuable primer for helping the HALS team understand waterworks systems.

> *"In digging canals we must consider that water will come to a level on its surface, be the form of the bottom as it may. If we have once determined the area of the section of the canal necessary to convey a sufficient quantity of water to the mill, we need only mind to keep to that area in the whole distance, and need not pay much regard to the depth or width, if there be rocks in the way. Much experience may be oftentimes saved, by making the canal deep where it can not easily be got wide enough, and wide where it can not easily be got deep enough.*
>
> *"When water is to be conveyed under ground, or in a tight trunk below the surface of the water in a reservoir, to any considerable length, there must be air-pipes (as they have been called) to prevent the trunk from bursting. To*

*understand their use let us suppose a trunk 100 feet long, 16 feet below the surface of the water, to fill which we draw a gate at one end of equal size with the trunk. Then the water, in passing to the other end acquires great velocity if it meets no resistance, which velocity is suddenly to be stopped when the trunk is full. This great column of water in motion, in this case, would strike with force equal to a solid body equal weight and velocity, the shock of which would be sufficient to burst any trunk that ever was made of wood. Many having thought the use of these pipes to be left out of the air, have made them to small, so that they would vent considerable velocity, but would not vent the water fast enough when full, to check its motion easily, in which case they are worse than none at all, for if the air cannot escape freely, the water cannot enter freely….*

*"Therefore I do conclude it best, to make an air-pipe for every 20 or 30 feet, of the full size of the trunk; but this will depend much on the depth of the trunk below the surface of the reservoir, and many other circumstances."*[65]

Observations on improving of Mill-Seats

*"Strange as it may appear, yet it is a real fact, that those who have least experience in the milling-business, generally build the best and completest mills.—The reasons are evident—*

*"The experienced man is bound to old systems; he relies on his own judgment in laying all his plans: whereas, the inexperienced man, being conscious of his deficiency, is at liberty; perfectly free from all prejudice, to call on all his experienced friends, and to collect all the improvements that are extant.*

*"A merchant who knows but little of the millers art, or of the structure or mechanism of mills, is naturally led to the following steps, viz.*

*"He calls several of the most experienced millers and mill-wrights, to view the seat separately, and point out the spot for the millhouse, dam &c. and notes their reasonings in favour of their opinion. The first perhaps fixes on a pretty level spot for the mill-house, and a certain rock, that nature seems to have prepared, to support the breast of the dam, and an easy place to dig the race, mill-seat, &c.*

*"The second passes by these places without noticing them; explores the stream to the boundary line; fixes on another place, the only one he thinks appointed by nature for building a lasting dam, the foundation a solid rock, that cannot be undermined by the tumbling water; fixing on a rugged spot for the seat of the house: assigning for his reasons, that the whole fall must be taken in, that all may*

[65] Oliver Evans. The Young Mill-Wright & Millers Guide. (Philadelphia: Self Published, 1795), p. 123-127.

*be right in a future day. He is then informed of the opinion of the other, against which he gives substantial reasons.*

*"The mill-wright, carpenter and mason, that ate to undertake the building, are now called together, to view the seat, fix on the spot for the house, dam, &c. After their opinion and reasons are heard, they are informed of the opinion and reasons of the others, all are joined together, and the places are fixed on. They are then desired to make out a complete draught of the plan for the house, &c. and to spare no pains to plan all for the best; but alter and improve on paper, till all appear to meet right, in the simplest and most convenient manner; (a week may be thus well spent) making out complete bills of every piece of timber, quantity of boards, stone, lime, &c. Bill of iron work, number of wheels, their diameters, number of cogs, &c. &c. in the whole work. Each person can then make out his charge, and the costs can be counted nearly. Every species of materials may be contracted for, to be delivered in due time; then the work goes on regularly without disappointment, and when done, the improvements are complete, and 100l. out of 1000l. at least is saved by such steps."*[66]

<u>On Building Mill-Dams, Laying Foundations, and Building Mill-Walls</u>

*"There are several things to be considered, and dangers to be guarded against, in building mill-dams.*
*"1. Construct them so, that the water tumbling over them, cannot undermine their foundations at the lower side.*
*"2. So that heavy logs, large pieces of ice, &c. floating down, cannot catch against any part of them, but slide easily over.*
*"3. So that the pressure or force of the current of the water will press their parts more firmly together. If the dam is built of stone, make it in the form of an arch or semicircle, standing upstream and endeavor to fix strong abutments on each side, to support the arch; then, in laying the stones, put the widest end upstream, and the more they are drove downstream, the tighter they will press together. All the stones of a dam should be laid with their upstream ends lowest, and the other end lapped over the preceding, in manner of the shingles or tiles of a house, to glance everything over…. The breast may be built up with stones, either on a good rock or log foundation, putting the best in front, leaning little upstream, and on the top lay one good log, and another 15 feet upstream on the bottom, to tie the top log to, by several logs, with good buts, downstream, dovetailed and bolted strongly, both at bottom and top and upstream logs; fill in between them with stone and gravel, laying large stones slanting next the top log, to glance any thing over it. This will be much better than to build all of stone; because if one at top give away, the breach will probably increase rapidly, and the whole go down to the bottom.*

[66] Oliver Evans. The Young Mill-Wright & Millers Guide. (Philadelphia: Self Published, 1795), p. 177-178.

*"I have, in many instances, seen the mill set so close to the dam, that the pierhead of forebay was in the breast; so that in case of a leak or breach about the forebay or mill, that thee is no chance of shutting off the water, or conveying it another way; but all must be left to its fate. The mill is frequently broken down, and carried away; even the millstones are carried a considerable distance down the stream, and sometimes buried under the sand, and never found.*

*"The great danger of this error will appear more plain, if we suspose six mills on one stream, one above the other, each at the breast of the dam; and a great flood to break the first or uppermost dam, say through the pierhead, carrying with it the mill, stones and all; this so increases the flood, that it overflows the next dam, which throws the water against the mill, and it is taken away; the water of these two dams has now so augmented the flood, that it carries every mill before it, until it comes to the dam of the sixth, which it sweeps away also; but suppose this dam to be a quarter of a mile above the mill, which is set well back into the bank, the extra water that is thrown into the canal, runs over at the waste left in its banks for the purpose; and the water having a free passage by the mill, does not injure it; whereas, had it been at the breast of the dam, it must have went away with the rest."*[67]

Appendix Three: Elder Frederick Evans

Elder Frederick, as Frederick William Evans was known within the Shaker society, had emigrated from England. He was born in Leominster, Worcestershire, England on June 9, 1808, and reared in Chadwick Hall, near Licky Hill, until he was 12 years old, there receiving training in the management of a landed estate. There, the youthful Evans was impressed with the scientific management of a large agricultural estate, with an introduction to the expert skill of its manager and all the diversity of an English model farm of the times. The following description sheds some light on the background that may have influenced Evans in managing Mount Lebanon Shaker Village.

*"The farm was very hilly and woody, and dotted with five fish-ponds formed from a stream that ran through it. There was plenty of fish and game, and the woods were vocal with the great variety of singing birds, from the jackdaw to the nightingale.*

*"Here," said Evans, "I was allowed to educate myself to my heart's content, reading and studying the vegetables and the fruits (and of these there variety and abundance, including the apple and pear to the apricot and gooseberry), in all of*

[67] Oliver Evans. The Young Mill-Wright & Millers Guide. (Philadelphia: Self Published, 1795), p. 67.

*which I was deeply interested. The land and its crops, the animals and the servants who attended them, together with those who officiated indoors, were all my school-masters and mistresses, and the servants were not less my particular friends, for I was a Democrat.*

*"The example of the order and economy practiced at Chadwick Hall was not lost upon me. Two uncles, John and James, managed the farm. One remained at home mostly; the other attended the fairs and markets, which latter are held once a week at the principal towns. Here the farmers and dealers meet to sell and buy all the products of their farms; the grain being bought and sold by samples. The fairs were much the same thing, but the sales were principally of live stock on a large scale. On these occasions, servants (male and female) congregated together, and hired themselves out for the ensuing year, each one producing his "character" on paper from his former employer.*

*"To these markets and fairs my uncle John used frequently to take me; and there I learned the relative value of property, and how to buy and sell. At home I learned to take care of horses, cattle, and sheep. Everything moved as if by machinery. For instance, there were some twenty horses; and in the morning, at a regular hour, they were all turned out to water as we now turn out cows. Whilst they were gone, their mangers were cleaned, and the racks emptied of any hay left in them overnight; this was put aside to be aired, and fresh hay was given, at night, however, the aired hay was first fed out, --nothing was wasted or lost.*

*"In the house it was the same. Once a month they washed; once a week they baked bread made from unbolted wheat, black enough, but sweet, especially when, as often happens in that unfortunate climate, the wheat is grown; then the bread is sweetish. But the people are not dyspeptic; nor do they in the country commonly eat pills."*[68]

## Appendix Four: Shaker Landscape Archaeology

The research and documentation by HALS team conducted on the North Family waterworks had only little precedent in Shaker waterworks and perhaps none as comprehensively as a study of cultural landscape, as is chronicled below

*"The historical archaeology of Shaker communities is a very young field. It began in 1975-1978 with the excavation of a Shaker mill complex on Shawnee Run, near Pleasant Hill, Ky. (Janzen 1981). From 1978 through 1980, David R. Starbuck directed a multidisciplinary, large-scale project at Canterbury, N.H., mapping of the entire community at a 1:500 scale, social and architectural*

[68] Frederick W. Evans. *Autobiography of a Shaker.* (Philadelphia: Porcupine Press, 1972), p. 3-11).

*history, and oral history (Starbuck and Smith 1979; Starbuck 1981, 1986). The only other Shaker community to be so mapped is Sabbathday Lake, Me., carried out by Richard Faulkner. In 1983 and 1984, Starbuck directed limited excavations at Hancock."* [69]

[69] Coe, Michael D. Mt. Lebanon Shaker Village NEH Application. September 30, 1986.